

THE 55 a 8
Sea-Gunners
COMPANION,
OR
Practical Rules,
Explaining the Use of
ORDNANCE
And other Stores in *Sea-Service*.

WITH
Directions for Gunners, &c. how to govern
themselves; and for their better Instruction is
given an Exercise proper to be understood by
all Officers for Instructing of Seamen.

And also Advice for fitting of Fire-ships, with
the Ingredients proper for them.

An *Appendix*, shewing how to give an Inventory
of Stores necessary for a Train of Artillery of
10 Guns, and the Gunners Duty in general.

By Capt. *Francis Povey*, formerly an Officer at
Tangier, and since Surveyor and Comptroler of
the Ordnance in *Ireland*.

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Postern on Tower-Hill, 1702. ✓



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T O T H E
Right Honourable
T H O M A S

Earl of *Pembroke* and *Montgomery*, &c.

Lord High Admiral of *England*,
Ireland, &c.

May it please your Lordship,

IT was my great Zeal and Resolution to serve my Country, that put me upon publishing this short Treatise of the use of Ordnance in Sea-Service : And having diligently observed the great want of some Discipline, to render that Service of greater force, and to pre-

The Epistle

prevent unnecessary Expences of Ammunition. I have therefore tendred it to your Lordships Protection and Partronage, as a true Judg and Rewarder of Merit.

I have here preferred the Publick Good before my own Preferment; if any Errors can be laid to my Charge, I humbly beg your Lordship will cast a favorable Construction of them: and I do not question but that your Lordships Generous and Innate Disposition to encourage Men of Capacity and Experience, will distinguish such before any Ignorant and Unexperienced Pretender, to whom this small Treatise may be subject to Censure.

My Lord,

As this was the best Expedient to testifie my Affection for an Introduction

Dedicatory.

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roduction to His Majesty's Service,
Especially when our Conuntry is threat-
ned by Powerful Enemies : So I hum-
bly hope to receive your Lordship's
Pardon, for the Boldness I take in pre-
fixing your Name to this Book ; and
shall always testify with Gratitude the
Honour your Lordship shall be plea-
sed to give me, of Subscribing my self,

Your Lordship's

Most Humble

And Obedient Servant,

Francis Povey.

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To His
Royall Highness
Prince George
of
Denmarke

Lord High Admirall of:
England and Ireland &c

May it Please yo^r. Roy^{al}. Highness
This small treatise was writt wholly
for the good of my Country, and presented
it to y^e Protection of the Lord High Admirall
as the proper way to incourage my designe
But meeting with no returne, and fearing
my intire Affection to serve her Maj^{ty}. might
be frustrated. I therefore humbly begg leave
to lay it before yo^r. Roy^{al}. Highness, as
a Signification of my Ability in those
Services. Not Doubting but yo^r. Princely
Wisdom will permitt the Authors Resolutions
to share of yo^r. Roy^{al}. Bounty & Favors to
be incouraged, to serve in the Office of
Ordnance wherein he served above 25
yeares faithfully both in England and
in Forreigne Parts.

But

But least the Malice of some People
may Charge mee wth serving King James
faithfully. I therefore humbly Confess
But since His Sacred Maj^{ty} is dead
think my self intirely a Subject of The
Roy^{ll} and Sacred Maj^{ty} and Confirm
my self by such Oaths as the Law has
prescribed. And I humbly assure
Roy^{ll} Highness if may be employed
will demonstrate my fidelity by
lessning the Present Charge of great
quantities of Amunition to neake
of Cent^s and also make such Provis
more usefull and less dangerous in
their proper Services. All w^{ch} is humbly
submitted to yo^r Princely Considera

By

yo^r Roy^{ll} Highness

Most Humble

and Obedient Servant

Francis Powel

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THE
P R E F A C E
TO THE
R E A D E R

Courteous Reader,

WHAT I here present is carefully derived from Practice, and is more particular for Sea-service. And tho I am not ignorant that some have already pretended to write on the Subject of Gunnery ; yet by a diligent inspecting their Works, I have found many false and erroneous Notions, being no ways proper for instructing of Men fit to be employed in His Majesty's Service.

The Preface

I have therefore, with regard to the Benefit and Service of my Country, spent some leasure Hours, and have laid down some Practicall Rules, necessary and convenient for all Gentlemen, and others, that desire to understand how to serve as Gunners in His Majesty's Service.

1. I acquaint you of the Natures and Proportions of Brasse and Iron Ordnance with Reasons for laying aside the severall Degrees of Ordnance used in former times.

2. How to fortify a peece of Ordnance in it's proper Place, and to know the Reasons of Honey-Combs; with Directions for boring and searching of Guns, and what Guns are proper to be received from the Founder.

3. Directions for making Carriages Trucks and Extrees, with the Natures and Proportions of Shot of all kinds.

4. I have explained the Errors of some Writers touching the Use of Guns and Powder.

to the Reader.

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der, and have supplied you with proper
Advice for knowing of Powder, and how
to preserve it from decaying.

5. You have Directions for using your
Guns in time of Service; and for your
better Instruction, refer you to such Rules,
which I have composed as an Exercise, to be
learned by Officers and Seamen.

6. Is shewn you Directions how to fit a
Fireship, with the Names of such Ingredi-
ents as are necessary for the same.

Lastly, In regard Gunners of Ships may
be detachd for Land-Service, or preferred
to Garisons, I have added by way of
Appendix, a short Method, how to draw
an Estimate or Proportion of Stores applica-
ble to a Train of Artillery consisting of Ten
Guns; with Directions how to Erect Batte-
ries, and Instructions how a Gunner ought
to demean himself in a Marching Train.

In all which Work, I have used all the
Brevity I could, but have made it so plain,
that

The Preface, &c.

that every ordinary Capacity may be made capable of doing his Country Service. And I hope when it meets with a Mature Observation from Persons of more accute Parts: That then my good Intentions may deserve their belief, that I am a Lover of my Country, and

Your Assured

Friend and Servant



Francis Povey.

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An Inventory of Ordnance, and o-
ther Stores for a Train of Ten
Guns.

OF

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ORDNANCE,

O R

GREAT GUNS.

THis *Machine*, call'd Ordnance, was invented as many Writers apprehend in the Eastern Parts (as *China*) where Powder was undoubtedly known long before it came into *Europe*: And it may be very probably allowed, since we have such vast Quantities from those parts. The more Exact Service of Ordnance was brought into *Europe* by the *Portegues* and *Spaniards*, and they have at this day the largest Brass Guns, and made of Excellent Mettle. However our present Age, by much Practice in War, have much improved their Judgment in founding of Great Ordnance; the French in particular are now great Masters in this Art, and give all ingenious Founders considerable Encouragement. This Point in my Opinion as much Concerns *England* as our Neighbours. And yet I do not find any Provision made, to provide for any Particular Person by yearly Sallery, or otherwise. This is a reason that Encourages the French King to seduce all Persons that he finds ingenious and discouraged; and by this Policy makes himself Master of the best Artists of all Nations.

Of Brass Ordnance.

Brass Ordnance near two hundred Years past were of small Demensions, but Experience in War made the *Spaniards* enlarge them to greater Proportions; and it

B may

may be likewise allowed that Powder was made Stronger.

The Proportion of Mettle allowed Guns in that time was $\frac{7}{3}$ parts of the Bore or Caliber at the Base-ring, and $\frac{1}{2}$ of the Bore at the Muzzle, and so continued the line of Mettle, as *per* Figure (4.) These Dimensions were very great in regard Powder was not of half the strength it is now : yet I have seen some of their Guns us'd on Board our Ships of War. And it is my Opinion, that this allowance of Mettle is enough in respect to Sea-Service (provided the Mettle of our Guns was as good.) All Guns design'd for Chase must have full Diameter of the Bore for the Mettle at the Base-ring, and a half Diameter at the Muzzle.

Ordnance of great Lengths that is above 10 Foot must be well fortified, otherwise your Gun will want Mettle in the Proper Place, which you will find by Demonstration, in Figure (5.) Such Guns are proper for Chase or Land-Service. It is certain well-fortified Guns will out Shoot those less fortified : But they are too Weighty for Sea-Service ; yet far more useful than Iron, being less subject to Casualties or Breaking.

The Names of Ordnance us'd in Former Times.

I have seen several Books in which the Authors have given an account of sundry Names of Ordnance ; but cannot conceive any reason for it ; since such Guns are now useless : However I have here set them down, in order to shew why they were laid aside, which will give you a more clear Satisfaction, rather than to trouble the World with fanciful Notions. For it is evident, Demonstration grounded on Practice, is what will be of more Service to a Learner than troubling his Thoughts with things of no use.

	Bore.		Shot.	
	Inch.	Pts.	Inch.	Pts.
Cannon Royal	8		7	4
Demy Cannon, Largest	6	6	6	5
Demy Cannon, Ordinary	6	4	6	1
Demy Cannon, Lower	6	2	6	
Culvering, Largest	5	4	5	2
Culvering, Ordinary	5	2	5	
Culvering, Best	5	0	4	6
Demy Culvering, Elder	4	6	4	4
Demy Culvering, Ordinary	4	4	4	2
Demy Culvering, low.	4	2	4	
Saker, Eldest	4		3	6
Saker, Ordinary	3	6	3	4
Saker, Lowest	3	4	3	2
Mynion, Large	3	2	3	
Mynion, Ordinary	3		2	7
Falcon	2	6	2	5
Falconets	2	2	2	2
Rabonet	1	4	1	3
Base, or Petterero	1	2	1	1
24 Pounders	5	79	5	56
12 Pounders	4	61	4	40
8 Pounders	3	89	3	75
6 Pounders	3	70	3	49
3 Pounders	3	70	2	77

Ordinance us'd in our present Services you will find hereafter : And whereas you have in the foregoing account of Guns so many different Names, whose Shot had great disproportion to the Mettle and Powder allowed : it was therefore found necessary to reduce those Guns, and to make use of others, as were proper for Land and Sea-Service, but particular for Sea, as by Example you will find in the Catalogue several Distinctions of Demy Cannons ; so of Culvering, &c. Now if so many sorts were employed on Board a Ship, what

a Confusion and Mistake would be committed in carrying of Powder, &c. Cartridges and Shot answering so near each other? All Countries but *England* name their Guns by the weight of the Shot; which I think very proper.

Of Pettereroes.

A *Pettereroe* is a *Machine* imitating a Gun, as in Figure (6.) There is almost a Semy Diameter of the Bore left open at the Base-end for putting in a Chamber which contains the Powder. The Chamber is made of hammer'd Iron, and when plac'd in the Peice is bolted with an Iron Wedg, then you put upon it a Wadd, and Shot, or Bags of small Shot or Stones, and a Wadd after. These Guns are much us'd on Board the *Spanish Sytea's*, *Lartan's*, and *Barcalonga's*. They are very serviceable for to prevent Boats boarding a Ship; or Boats that are to land Men; or for Men that retreat. They have been us'd in *England*, but at present laid aside.

Rules to be observed, by such Officers as are to take care of Casting Brass Ordnance.

When Brass Guns are ordered to be cast, the Surveyor who is to take care of the Demensions, must also observe the goodness of the Mettle. For it's certain a Gun made with good Mettle, though less in Proportion, will out-shoot another of the same Nature, if better fortified. And the Founders Profit is by advancing of Mettle: Which will hide the Cheat by the Guns bearing the Poof, and when he is paid, receives the best Price. This point must be rectified by an Essay of Mettle, which ought to lie in His Majesty's Stores, for a Rule every Founder must be govern'd by, and that a part of every Gun when Cast should be compared with the Pattern of Mettle.

That a Foundry kept by a National Concern; is of

far greater Service, and Honour to the Kingdom, than employing Merchants dealing in Guns. By this Method, Ingenious Founders might be set on work, and allowing some constant Sallery, will encourage them to Serve their own Country ; especially when they have a preference before Foreigners ; for it is certain Rewards for Service performed, is what all men expect ; but not complied with, disorders the Frame of Obedience, Loyalty and Honesty. When such a Foundery is made, you will be sure your Ordnance will be exact for Service.

How to Proportion the Mettle of a Brass Gun, so as a Gun of the same Diameter and Weight shall Burn more Powder ; and consequently outshoot the same.

According to the vulgar way of Proportioning Ordnance, as in Figure (4.) you find such Guns bear their allowance of Powder ; but since it is evident that reinforcing Mettle adds to the strength and force of all Ordnance, I thought it convenient to demonstrate this Point, having found it rational and guarded by Practice. I cannot recommend it wholly for Guns in Sea-Service, because of their different Lengths, but for Chale-Guns it is very proper, and for Forts situated near the Sea-Coasts ; out of which Guns, you may shoot much farther by allowing of more Powder.

Explanation.

When you have drawn the Center line AB: then draw your lines distinguishing the Bore ; then instead of setting of the Diameter of your Mettle at the Base, and $\frac{1}{2}$ at the Muzzle.

First draw your Line C, then carry your Line of Mettle to your Trunnions D : allowing $\frac{6}{8}$ of the Diameter of the Bore, and draw your Line CD ; then set off $\frac{1}{2}$ for the Mettle, at the Muzzle E, and draw your Line

B 3

DEF

DEF ; so is your Lines of Mettle performed. You are to reinforce your Muzzle with Mettle between the Trunnion-Ring and Muzzle, as *per* Figure. What Mettle is lost from the Reinforc'd-Ring to the Muzzle in the common way, adds Mettle for strengthening the Gun in the proper Place.

To remove Queries and Notions, which some People are subject to fancy, I therefore do assert, That Powder has its force a very small matter before the Trunnions, as I have observ'd in many Experiments. And I think it may convince any Rational Man ; that if Powder had the same force at the Muzzle, as at the Base, then a Gun would appear a strange Mass of Mettle. But since addition of Mettle, makes a Gun of greater Service, if applied rightly, I hope reinforcing a Gun, as directed, will burn more Powder, and then consequently the Shot will be carried with a greater Violence.

This way of Reinforcing Mettle, will add much to the Service of such Guns as burn Powder near to the weight of Shot, *viz.* Guns of 12 l. Ball, 9 l. Ball, 6 l. Ball, and 5 $\frac{1}{4}$ Ball, &c. All Guns above 18 l. Ball I think improper to be Reinforc'd, because their Shot is in too great a disproportion of weight to the Powder, and their Cylanders being large, may not indure an Addition of Powder : For it is certain, Powder fires more violent than in narrow Bores, and their Shot being weighty, causes a greater Convulsion in the Gun ; which may probably break the Gun.

Of Iron Ordnance.

Iron Ordnance, well fortified, clear cast from Hony-Combs, and true bored, will out-shoot Brasses ; which I saw done in the Presence of His Highness Prince Rupert at *Woolwich* ; yet they cannot be prefer'd before Brasses for Sea-Service ; their weight being a great burthen and strain to Ship's Decks and Sides, especially in bad

bad Weather: Besides the great hurt an Iron Gun often does when it breaks.

There was Expedients found in *Cromwel's* time to lessen the weight of Mettle, which was by taper-boring some lower than others; it may be supposed also, that it was to save Powder. This Projection carried with it many dangerous Consequences, *viz.*

First, if you do not fight close, your Shot will drop short of your Enemy; your Powder being too little in Proportion to the Shot. This gave great Incouragement to the Enemy to fight: A Point which was too obvious in our former Wars with *Holland*. And I do remember great Complaints against the Officers of Ordnance for receiving bad Powder, but that was for want of Judgment, and to palliate the Fault of such Officers as do not cover to fight Close: and having these sort of Guns, created a loss of that Honour that our Nation might have preserved, had our Ships been provided with fortified and home-bored Guns.

These Taper-Guns may do Service, but great Care and Difficulties are put upon the Ships Company in using them: I have known amongst the Number of Guns allowed a Ship, several of different Bores, which creates the following mistakes in carring of Powder.

First, though the Gunner has made his Cartridges exact to the Guns, yet in a hurry of Action a home-bored Cartridge may be put into a Taper-Gun, by an Ignorant Sailer, who adding much Powder to Prime her, breaks the Gun, and so kills many Men, besides the Disorder it puts the Ship into. If a Taper-Cartridge be put into home-bored Guns, then the Shot will do but little Execution, perhaps drop short of your Enemy.

In regard our Nation is not so well provided with Brass Ordnance, as to supply our Navy, it therefore highly concerns those that are intrusted in the Office of the Ordnance, to provide the best Iron Guns: Carefully allowing them that Proportion of Mettle as may

make them useful in Service: receiving them from the Founder, free from Hony-Combs. The Founders have the cunning to stop up the Hony-Combs with melted Lead, which Invention often passes proof, and prevents the Searcher finding the Fault. This Cheat is of dangerous Consequence, for by much firing, the Lead will work out; and then this Gun will certainly break; and Lodging of Fire in such Flaws is the occasion of many a Mans Life being lost, when they put home Powder before the Gun be well spunged. Many other Accidents attend these Faults; and therefore no Gun of Iron ought to be received into his Majesties Service, that has a Hony-Comb abast the Trunnions; or truly in no other part.

All Iron Guns must have $1\frac{1}{4}$ Diameter of the Bore for the Mettle at the Base-ring, and $\frac{1}{2}$ at the Muzzle (from Cannon of 7 inches to 12 Pounders) and for Guns under those weight of Ball, one Diameter and $\frac{1}{8}$ and $\frac{1}{2}$ at the Muzzle, as *per* figure (7 and 8.) The Trunnions are plac'd as in Brass Guns, having $\frac{2}{3}$ of the Mettle above the Centre of the Trunnions: The Muzzle the same for Sea-Service. You must take care your Breech-end have no Burs or Roughness, for that will Fret and Gaull your Breechings and Tackles, which are to secure your Guns in bad Weather. The reasons your Muzzles are not made with a raised Cornish or Moldings is to prevent the Gun hanging on the Port-Cells, at the Reverse; which Accident often breaks a Gun, when hot, and likewise, over-sets her.

There are several Iron Guns, which wear Neal'd and Turn'd, but I never found them exceed other Iron Guns, in Service, only they were freer from Hony-Combs (that was one thing;) another thing was, they were truly bored; and the Mettle equal on all sides, which cannot be promised in Rough. These Guns cost half the value of Brass; and of no more service than the Rough Guns, as before mentioned.

Since

Since Iron Guns are of that weight which makes a Ship old before her time ; I thought it would not be amiss to recommend my Opinion in altering the Natures of Guns for Shipping ; to the end Ships Decks may not be over-burthned with weight, and the Charge of Powder, Ball, &c. be much lessened, viz.

On board the first and 2d Rate Ships, which are not expos'd to Voyages, may be allowed Guns as formerly. But for third and 4th Rates, I am of Opinion they are over Gunn'd. It's certain a Demy Cannon shot is larger than a 24 Pounder, and yet the latter shall dismast or break any Bolt, or Knea, or Beam, as soon as the Demy Cannon : So likewise a 12 Pounder to a Culvering ; and so to lower Guns. Now this Demonstration is a convincing Argument to alter and change all weighty Guns for less : both for lower, middle, and upper Tires. If this be performed, your Ship will not labour in Weather with that Danger, the Nation will be much easier as to Charge, and the Guns made use of in Action, with greater Success.

When the Founders have cast their Guns, they bring them to the Place ordered for Proof. Then the Proof-masters, Master Gunner of *England*, and other inferior Officers, see them plac'd against a But of Earth, which is to receive the Shot. After you have clear'd the Gun from Stones, or Gravel, and Spung'd your Gun, you put a Ladleful of Powder into the Gun with a Wadd, and blow it off : which will clear and prepare your Gun for Loading for Proof. You then proceed and weigh your Powder, and is a greater quantity than is allowed for Service, as you will find hereafter. When you Load without Powder, you must be sure after every Ladle-full to put up the Powder with your Rammer-head, if you neglect this, you will find when you put home your Wadd, that a great quantity will be before the Wadd which must not be. Your Wadd must be very full and hard, and ramm'd home with 3 or more good Strokes

Strokes. When you are loaded with Powder, then see your Shot is a clear Shot, and put it into the Gun with a good Wad after it, Ramming it home well : So is your Gun ready to Fire ; after Firing, you must proceed to load as before, and if the Gun holds the second proof, it is then receiv'd as fit for Service, if free from Hony-Combs.

How Guns are Subject to Hony-Combs.

This thing call'd a Hony-Comb, derives its name from the Comb of Bees, which is full of holes. The occasion is often by the Noel which makes the Concave of the Gun. If it be not well wrought and Neal'd from any Moisture, your Mettle running hot, and meeting with any sort of Moistness, causes a sort of Convulsion in the Mettle ; which cooling, leaves great holes, which cannot be bored out, especially if your Noel be made too high : which is often done to save the trouble of Boreing.

How to make a Searcher, to search your Guns, after Proof, or at any other time.

You must make a Socket or Head of Iron, about an Inch and half wide, in which a Staff must be put, at the other end of the Head : You must have 4 long pieces of Steel, of 16 Inches long each, and half an Inch in Breadth, and half a Quarter in Thickness. These are to be fixed fast, or to screw off and on, and are plac'd opposite to each other. If you have six Springs, it will be better. The ends of every Bar must be turn'd back about a quarter of an Inch ; which will hitch or hang in the Hony-Combs or Flaws ; There is a second Staff, on which a Ring of Iron is fixt at one end ; Through this Ring you put your first Staff, and so forces up your Springs to close. When you have put home your
Searcher.

Searcher to the Breech or Chamber of your Gun, then draw back your Staff which is call'd a Relief, and drawing forth your Searcher easily keeping it turning with your hand. If you find it hitch or hang in any Crack or Comb, you must first mark your Staff by rubbing or grating it against the Muzzle, then have you performed the Work of Searching.

Having found the Gun to be Hony-com'd, you must take a Looking-Glass, and placing the Muzzle of the Gun to the Sun, you must close and convey the Sun-Beams into the Gun, and observing where the Hony-Comb is, by the Searcher, you will judge of the Defect. You may do the same by a lighted Candle fixt on a Staff, putting it home to the Chamber, and drawing out easily will perform, as before directed: But the following way is best, *viz.* Let there be made a Glass of 3 Inches wide, and 3 deep, having a small Dish of Tin on the bottom, in which must be plac'd some Cotten-Weeke dipt in Spirit of Wine. This Glass must be fixt at the end of a staff squar'd; and being put into the Concave of the Gun, and the Weeke lighted, you will more easier discern the Hony-Combs or Cracks, by the Rayes of that Light than from a Candle; which is apt to sulley, and cast a black steem which the Spirit of Wine will not.

The Shape of the Glass:



Of Carriages for Guns.

Carriages for Expeditious Service must be truly fitted for the Gun, and made for the height of the Ports of the

the Ship in which they are us'd, otherwise it is impossible to fire Guns nimbly. A careful and diligent Gunner must be very circumspect how he receives his Carriages, before he takes the Heights of his Ports from the lower Cell to the Deck, that the Carriage may receive the Gun, so as to look out of the middle of the Port, and laid under Mettle, if occasion is. Be sure your Carriage be full long enough, otherwise you cannot place your Beds and Coyes to Advantage, and if the Carriage be short, and check'd by the Reverse, it may overset your Gun.

You must take care your Trunnions have no Play under the Capsquares, for after firing, your Guns will dance and spue her Coyes, which will cause the Muzzle to strike against the Edg of the Port, and perhaps break the Gun.

The Trucks and Extrees applyed to these Carriages must be sound, These two Particulars being often defective (especially Trucks) which often splits by having too much play from the Linchpin, makes the Carriage surge, and twist the Trucks, which being cut with the Grain of the Wood are apt to split.

Trucks us'd for weighty Guns must be very substantial, having a good Breadth on the Soul or Bottom

Extrees being large requires a large Bore in the Truck, which lessens the Strength of it, by so much wood being taken away, and if it be not broad on the Soul, it will soon split.

It is my Opinion Extrees of Iron would be far more serviceable, in regard the Bore of the Truck will be much less, and then without doubt stronger; And for the Charge, I will justify it to be much cheaper than wood, which is always perishing, as is some hundreds in store, which were never used, rotten and worm-eaten

This Point may not please some Persons, to whom old wood is a certain Perquisite: And therefore may be objected against, as being a Charge upon the King. To
which

which I answer, that the spare Extreës, and some Trucks may be spared, which will be an Equivolent, as to the first Charge ; But then very few spare Iron Extreës will be wanting : And if at any time broke may be repaired, and when returned from Sea will always be ready for Service, and no fear of the Worm to make them a Perquisite.

All Carriages when fitted for a Ship, ought to be kept apart for that Ship, unless there be a great necessity to make use of them for some other Ship. If a Gunner must be supplied in this manner, he must be very circumspect in fitting his Guns to the Carriages, for it cannot be supposed that such Carriages will truly fit ; being not designed for the Guns : if too large in the Body you must line it with Cleates of Planck, if too small, you must take away wood from the Bracker. You must therefore add on the outside against the Trunnions of your Gun, such a thickness of Planck as that the Gun may lie firm on the Carriage.

There are several Carriages fitted with dead Trucks which are plac'd under the Hind-part of the Carriage. They are only a Cleat of Wood fix't or bolted to the bottom of the Bed. These Carriages are always plac'd on Quarter-Decks, where the Ports are very near the Deck, and will not admit of live Trucks.

Having given a perfect Demonstration of a Compleat Carriage ; I shall now give you the scantling of Timber applicable to Carriages, Trucks and Extreës.

The most useful Timber for Carriages (is *Elm*) the Scantling of the Planck for the Sides, or Brackets, must be the thickness of the Bore of your Gun, and the Bed $\frac{2}{3}$ of the Bore, and may be *Oak* or *Elm*.

Trucks must be made of the best Curl'd *Elm* Planck, the Scantling on the Soul, to be full the Diameter of your Gun, for the fore-Trucks, and the hind-Trucks the height of the Shot.

Extrees of Wood must be of good clear *Ash* or *Oak*, but generally *Ash*, and are commonly squared with the Diameter, or Bore, of the Gun on each side, before they are fitted to the Trucks.

The Natures and Proportions of Shot.

Iron Round-shot are always allowed a quarter of an Inch lower then the Diameter of the Gun, to prevent Accidents; this allowance was thought convenient and a sufficient Wind-way, as might render the use of them more ready and easy in Service. For it is certain a Round-Shot turns, when shot from long Cylinders, and if a Shot were to be made to a near scantling of the Bore of a Gun, it may happen that some may prove Eliptick, or Oval, and if such a Shot come to hand in Action, and put into a Gun, it would certainly break the Gun, and destroy poor Men.

I have observed many Nice Camera's for Wind of Shot, which Supposition never had any Truth in it. However this Wind-way lays aside all Foolish Notions, as being a material and secure reason. The use of this Shot you will find hereafter.

Double Head Hammer'd-Shot.

These Shot are made of hammer'd Iron, the shank or bar, between the two heads, being very strong, each head the height of round Shot. They are of that strength, that no Mast, Beam, Knea, or Iron Bolt can remain unbroken, when shot out of a Gun; the Guns out of which they are shot, are Cannon of 7 inches, Demy-Cannon, 24 Pounds, 12 Pounds, Culvering, Demy-Culvering, 6 Pounds, and Sakers. But it is my Opinion that Guns under Demy-Culvering are not fit to shoot the weight of double Shot, the Powder being too little for the use this Shot was design'd for.

Double

Double head hammer'd Shot are of a great charge to the King ; but several Dutch Engagements have made them of value to others, many be expended in Fight which must not be questioned when wanting. It therefore behoves every Commander to signify his Pleasure when such Shot shall be made use of in Action ; to prevent Embezlements.

Double-Head Cast-Shot.

This Shot is made with a round head at each end of a shank, being all cast, they are not of that Service with Double-Head-Shot hammer'd, for if it meets with Bolts or Knees, the Bar will break like Glais ; these Shot are good for Rigging.

There are often us'd in Service Square Iron-Bars, about 18 or 20 Inches in length, and armed with Spun-yarn, and Rope-yarns on each end. And then the Gunner fastens 2, 3, or more together according to the Guns they shoot them from ; they are proper to cut Rigging, and will do great Execution in clearing of Decks.

Chain Shot was formerly used, but since Double-head Shot, &c. is of much better Service, they are laid aside.

Base and Bur-Shot, is a piece of Iron cut from the Neck of an Iron Round-Shot, when taken out of the Mould ; they are very servicable, both in clearing Decks, and Cutting Rigging, and a good quantity may be shot from a Gun.

There is also a small Iron-shot of a pound weight, and is more useful than Bur-Shoot, and a Gun on a lower or middle Tier may shoot 20 or 30 of these Shot ; which will pearce a Ship side, which Bur-Shot will seldom do and must do extraordinary Service, when rightly applied.

There is yet another Machine, called a Tin-Case ; each end fixt with wood, when filled with Musquet and

and Pistol-Shot. Diameters of their Heads are equal to the Round-Shot of the Gun they are shot from ; and contain the weight of the Shot : They are generally used in Guns from 18 *l*. Ball, and so to Saker. These Cases are proper to clear Decks.

Of Hand-Granadoes.

This Ball is made of Iron about $3\frac{1}{2}$ Diameter Inches and is hallow within ; the thickness of the Mettle must be $\frac{3}{8}$ parts of an Inch ; The vent for your Fuze to be $\frac{1}{8}$ of an Inch Diameter : These shells are of excellent Service, either from Tops, or keeping Boats from Boarding, with many other Services. You must be careful in choosing them, that they be not Crackt. If you neglect this point, you may be the occasion of destroying your Friend instead of your Enemy. When you examine them, if they be Sound, and not Crackt, take a Hammer of Wood, and holding a Shell in your Hand, give it two or three stroaks gently, if there be any Crack not visible, it will afterwards appear, and Blowing into the Shell you will find the Crack.

To choose your Fuzes fit for these *Granadoes*, you must see they are made of good seasoned Beach, or Alder, clean bored, and not split : All these Faults, if not found, will contribute to your Disservice. The length of the Fuze is to be 4 Inches, and the Concave or Bore must be $\frac{3}{8}$ parts of an Inch.

To prepare your Fuze, you must examine the wood, and if you find it well seasoned, and clear bored, and of a fitness to fill the vent of your Shell, which must fade very close. Then bore a hole in a block of Timber, something bigger then your Fuze, then whip or woold your Fuze with Twine, as far as you think it will preserve the Fuze from splitting, while you drive it. After this put your Tap into the hole, thus your Fuze will be kept upright, and your Composition will have

true

true driving, which is a Material-thing for preserving a Fuze, if long kept. If you find the time of burning prove too long for your purpose, which may be by the Tap being too long, you must cut of some part of the small end, till you are satisfied with the time of Burning, which ought not to be longer, than you can count the Number of 15 or 16 in a moderate way.

The Composition for the Fuze.

To every 16 Ounces of Powder, well meal'd, add two Ounces of Camphire meal'd, mix them well together with a Searce, then drive it gently into your Fuze, by degrees, putting into the Tap, at each time, as much Powder as will lie on a Six Pence, driving it till it be compleated: when you have done thus, take off your whipping, and your Fuze is fitting to put into the Shell. Before you put your Powder into the Shell, let your Shell be clear from Dirt or Moistness; then fill your Shell above $\frac{3}{4}$ with Powder, and put into the Shell 6 or more Pistol-Bullets, Then put in your Fuze very rite and close, then take some melted Wax and Pitch, and pay round the Fuze, which is to keep the fire of the Fuze entring the Shell, which has often happened when the paying has not been well observed, and throwing a Shell to windward drives the fire upon the Shell, which may fire the Shell in your hand. This happened to be the case of Mr. Brown, a knowing Man, and then Master Fire-master to King Charles II, when he was directing how to sling Hand-granadoes at New-Market. Some will dip Shells into Pitch, and afterwards strew Sand on them; this is a true way to stop Cracks.

When your Shell is thus fixt, take some Leather, or Cartridge-Paper, Grees'd or Oyl'd and tie over the top of your Fuze, to preserve the Fuze.

To Meal your Camphire

Put your *Camphire* into a Brass Morter, or *Lignum Vite*, and drop a little Oyl on it, and Oyl the bottom of the Pestle; then Pound or Beat the *Camphire* easily, and by degrees it will be brought very fine like Meal. You must be sure to mix it with your Powder, as soon as possible, and drive your Fuze; otherwise your *Camphire* will waste insensibly.

Of Fire-Shot.

Fire-Shot would be of excellent Service, if prepared in such a manner as to be us'd without trouble: I have seen divers sorts and shapes, but not fit for Service, in regard there are many Difficulties which the Authors propose, in loading and firing them.

There must be no sort of Critical Inventions in time of Action, in Sea-Fights. A *Machine* for Sea-Service must be applicable, to Sailors Judgment in the ordinary way of loading: but before he fires must receive the the Captains Order, or other Officers, that knows how the Gun must be pointed.

I projected a Shot, which according to it's strength of Iron and force of Fire is fit for Sea-Service, being of no more trouble, than loading and firing a round Shot: This Shot is an oblong, of 14 Inches in length, and may be fitted for Guns as low as a Demy Culvering. The proof of this Shot, and the violence of its burning was obvious at *Woolwich*, to several Sea-Officers, now in Being, and in Command. There were at the time several Foreigners who projected Fire-shot, and made two vents, to the Gun, one to fire their Shot, and the other the Powder; but their Ingredients or Composition of their Shot, was blown out by the Blast of the Peece, though not half the quantity of Powder proper for Service

vice

vice of the Gun. The But which we shot against, was made up of old Ship Timber, as Knees and Beams, with very little other Matter. Yet I set it on fire immediately after lodging the Shot.

The same Shot I fixed a second time, to the same effect, with 3 others which my Lord *Dartmouth* gave me to fix, which burnt from the Gun ; but for want of strength broke at the But, all on fire : So that preparing the Composition, is what perfects the Design.

This Shot is of excellent use to prevent a Fire-Ship coming on Board ; for if you place your Shot in her, though it pass through both sides, yet it will leave fire behind, which will certainly set her in Flames.

There is no dispute if Ships of War, or Merchant-Ships did make use of them (especially the first) by carrying three or more in each Ship, in time of Action, they will soon oblige their Enemy to turn their Sterns to us ; and consequently carry fire in Head and Tail. Such an Execution as this Shot will certainly perform, will sufficiently recompence the Nation for the charge of providing them ; but there has such Misfortunes attended English-Men, that their Projections have not met with those Incouragements as would have oblig'd them, before Strangers, to act vigorously in those Studies, as may be of use to their Country for the future.

Of Powder for Ordnance.

The Niceness of this Compound Body is beyond conception, and yet several are so bold to make use of Powder Arithmetically, by thinking the Force is according to Proportion. I will be glad to hear any Man tell me, that in observing the strength of Powder, found by any Engine, whether equal quantities did not more or less differ in strength. This is the reason that creates those difficulties both in shooting out of great Guns and Mortars. I have seen many Experiments made of

Powder, but never could find that equal quantities answered in Proportion. It is Experience by Practice must be your Master, to direct you in the use of it.

I dare assert to all Mankind that no Powder-maker will pretend at all times, with the same Petre, Cole, and Brimstone to make Powder of equal strength, so Nice is the reasons of working it, that it ought to convince every rational Person of the impossibility of finding Powder to answer in Proportion.

This Body is composed of Petre, Cole, and Sulpher, the first must be well refined from Salt, the second finely ground and scarc'd, and the last refined from Dross and Oily Matter; when this is done, certain Quantities of each, are mixt and wrought by Mills, but not at the rate as is published by ignorant Writers, now extant. I could give a more perfect Discription of working these several Ingredients, but lying under particular Obligations I must be excused.

To find the Strength of Powder.

One way to know the strength of Powder, is by an Instrument that is frequently sold which shews you the strength, by burning a small Quantity, which turns a wheel to several Degrees: But the best way is out of a small Engine made like a Mortar-peece, which will burn about an Once of Powder in the Chamber, on which a Ball of about 12 *lib.* weight or more must be plac'd; and by flinging of this Shot, you will distinguish the Difference between the strength of Powder: This is certainly the best way of Demonstration.

The Way or Method used and observed in the Tower, is by the Ear and Eye, and yet is, if nicely observed, erroneous, though by knowing Men and Practitioners. And it may be boldly asserted, that the Proof-Masters are ignorant of the Practice and Use of Powder. If any Fault arise by the Imperfection of their Eyes and Ears,

Ears, perhaps it may be justly attributed to the Powder-Makers neglect in clearing them. Now to salve this Impediment, I will shew how any Man may be mistaken, *viz.* Let there be three several Powder-Makers contract to bring in Powder for the King; This Powder when past by the Surveyor, and Proof-Masters, is called *Tower-Proof*. Now I will appeal to each Powder-Maker, that what Powder they did prove might differ in value, if well understood by any but themselves, above 5 s. in a Barrel, in some Barrels, but yet go all at a Price: When you have observed with the greatest Care and Judgment, the Powder-Maker knows how far you are deceived.

There is a Policy of the Powder-Maker; which is to get his Powder prov'd, soon after stoveing, that it may rise and bounce, and so amaze the Proof-Masters.

This peice of Cunning is unknown to the Proof-Masters, as being no Judges either of the working part, or Reasons of stoveing. But it is certain, that well working of Powder gives strength to it, and likewise makes it hold the strength longer; for if your Proportions of Petre, &c. be not Extraordinary, stoveing will but give it a life for such a time as may deceive the Surveyors at Proof, and colour the ill-working of it.

If you will judg of the goodness of Powder by the Ear and Eye, you must observe if the Smoke rise with a sharp point, and without lights, and leaving no fulley on the Board; That Powder may be esteem'd good, It is not the Bounce which makes it good. Powder may rise strong, but if it spreads the Smoke, and thick, and with Lights, that Powder ought not to be receiv'd for the Kings Service.

It therefore highly concerns the Nation to make Choice of an Honest, and Ingenious Powder-maker; that Powder may be made in Perfection: without this Care, it cannot hold the strength; and consequently unfit for Service, and a wrong to the Nation.

This excellent Judgment of making extraordinary Powder was improv'd by Sir *Policarpus Wharton* Bar. and is of that great use that Common Powder cannot perform, for half the proportion will fling a Shell as far as double the Common: And consequently this Powder ought to be valued and encourag'd, as well for Mortars, as other particular uses.

*Powder allowed His Majesty's Ships,
in Peace and War.*

The Method used in the Office of Ordnance is to allow 30 Rounds for each Gun in time of Peace, and 40 Rounds in time of War. But in my Opinion both may be rectified, for Material Reasons.

First, As to time of Peace, such Friggots as are Convoys to Merchants-Ships are subject to Salutes, by going in and out of Ports, and meeting with Ships at Sea, &c. Besides many other incident things: and suppose by any Leak, part of the Powder be damaged, how must the Convoy be defended? must not Powder be purchased to supply the Defect, which costs more than in *England*, and not fit for Service, except for Salutes? This Point I appeal to such Commanders who have been Eye-witnesses of what I assert, and I think it is no ways surable to good Husbandry: And with reason may make this Comparison, that a Ship of War ill-provided, is like a Soldier unarmed, only fit to be made a Prisoner.

Secondly, In time of War there is allowed 40 Rounds to each Gun, and it has been found that all the Powder and Shot appropriated for upper Guns, expended long before the lower: And this happens when you cannot make use of them by reason of Weather. What will you do in this Condition, especially if engaged with two Ships, if not of equal force to your self? All that can be said, you must make a Running-Fight, till Weather

ther permits you to make use of your lower Guns, which must be done very close, otherwise you may soon be taken by your Enemy. This matter need not be farther explain'd, it being a clear Case, that you must add Courage in the room of Ammunition.

This was the Case in the 3 Days fight against the *Dutch*, when the Fleet was commanded by General *Monk*, Duke of *Albermarle*, the Fleet being divided. The whole *Dutch* Fleet attacking part of our Fleet, and the Weather hindring the use of the lower Guns, oblig'd our Fleet to Fight with the upper Guns, which were too soon expended. In this Engagement were lost and taken the *Royal Prince*, *Old St. Andrew*, *Resolution*, and several others. And the rest of the Fleet miraculously preserved, by Prince *Rupert's* Squadron coming in time.

To prevent this Surprise, There ought to be 50 Rounds for the middle, and upper Tires, and 30 for the Lower; this Allowance will endure a long resistance, if Weather will not permit you to use your lower Guns.

After all what I have said, as to this regulation, I am of Opinion, that if a Ship had but 20 Rounds to each Gun, and oblig'd to Fight the Enemy close, that one or other would be Victor before half this proportion were expended: Therefore to prevent great Expences of Stores, it would add to all Commanders and Officers Honours, to Engage and Fight their Enemy, as near as possible Weather will permit; which will soon shew the Difference between the strength of our Ships, and other Nations, and discourage the Enemy to see so great a Resolution in our Men.

To preserve Powder on Board.

This point is very material: and all Commanders when they take charge of a Ship, must examine, and see the Powder-Rooms are well Platform'd, and fixt without Nails, and that the Gunner of the Ship have

Chests convenient to receive Powder when fill'd into Cartridges. Otherwise your Cartridges will soon be rotten, especially Paper, and your Powder will also lose it's strength.

You must always have 30 Rounds fill'd, to prevent filling in time of Service, and several Accidents which often happens by hasty filling Powder, by unthinking Men in time of Action.

To lay Powder dry, and free from Moisture prevents another Accident, both as to Powder in Paper-Cartridges, and Powder, *viz.* Though a Paper Cartridge may appear sound, yet when taken up by the Neck, the weight of Powder breaks the Cartridge, and often has fallen on lighted Matches, and blown up the Men at the Guns. Besides this keeping Powder dry saves starting and shifting of Cartridges, which spoils Powder by breaking the Corn.

Cartridges.

A Cartridge or Bag in which the Powder lies, is made of Parchment, Canvas, or Paper. The first is best for Service, and less dangerous, in regard it leaves no fire in the Gun, after being discharged: And if any Breech be left in the Chamber, there is no further trouble than to draw it out with the Worm. Canvas and Paper often lies in the Crack, or Hony-Combs on fire, and if great Care be not taken by spunging well, before you load you certainly run the hazard of losing a Limb or Life, and sometimes others, besides blowing away your Ports.

Paper Cartridges must not be fill'd long before Action, and ought not to be applied to weighty Guns; but to the lighter Guns, which are commonly in use for Sa-

my Opinion that Canvas and Paper may be laced or oyld, and be made far more durable, and secure

secure from Moisture. But this point will want Encouragement.

Reasons why Powder Decays.

I have heard great arguments touching this Question, and particularly Reasons given by Writers of Books (being all frivolous) especially the Advice for Gunners to turn their Powder, to prevent the Salt-petre settling to the bottom of the Barrel.

That Salt-Petre cannot separate in that Nature is evident, unless it receives Water, then indeed it will dissolve and the liquid matter (Petre) will press downwards: But if your Powder be kept dry you need not turn your Barrels.

Salt-petre refined from Salt, is a dry matter of it self, and when incorporated, or mixt with Brimstone and Cole becomes dryer, and being well work'd, corned, and stov'd, will not separate but by much stirring, which breaks the Corn, and divides the Parts; and so spoils the Powder. This is a sufficient Reason against turning of Powder.

Powder cannot be preserved in any Ship, if it is not made of truly refined Petre. This matter is obvious to all Men, that Salt will grow moist towards alteration of Weather, if in a Chimney Corner: Therefore if there remains any Salt in such Petre, made into Powder, it will not continue good, tho' in a dry Room; for a small quantity will spoil a Barrel of Powder, this Error proceeds from a careless, or Ignorant Refiner.

A Gunners Care in the Filling-room.

This particular gives me no slight reason of recommending a more than ordinary Sobriety, by such as are employed in filling and starting of Powder.

A Gunner, with his Mates and Yeomen, ought to be very circumspect what Lanterns they use, that they be well fitted with good Glafs, and to hold Water in the bottom ; that when occasion requires, you may snuff or clear your Light, and the Snuff be extinguished without danger. These Lanterns must be larger than the *Muscovia* Lights commonly made use of. Thus will the Rays of your Candle spread more, and you will see better, which is Material.

To prevent any rash and foolish Action by obstinate Men, I therefore recommend to you a wonderful Escape of my self, and all the Ships Company on board the *Tryumph*, the Yeoman starting of Cartridges into Barrels, brought the Lantern from the Filling-room, to the Powder-room Scuttle, where the Cooper was heading of Powder-Barrels, the Yeoman takes out the Candle, and with his Fingers puts the Snuff under his foot, in order to press it hard and extinguish it, but Powder banging on his Shoes took fire, and run a Train amongst the Barrels, and towards the Filling-room, and by a wonderful and miraculous Mercy of God stopp'd doing no great damage, except frightening Men over Board, to save themselves. Let this be a Caution to all Gunners, how they choose their Mates, and Yeomen, since the Welfare of so many poor Men depends on their Care and Sobriety.

No Person must go into the Filling-room with Shoes which he commonly wears, for generally Seamen put Sparrables of Iron, to preserve their Shoes from wearing out.

A Gunner must have Tann'd-hides spread, that what Powder falls from the Cartridge, in filling, or starting, may be taken up without prejudice ; which if it lies on the Plat-form, and you gather it up, by sweeping it together, it will Bruise the Corn. Such Powder ought to be set apart for Salutes.

The following particulars are the Proportions and Diameters of all Ordnance us'd in *England*, and also the quantities of Powder for Proof and Service, Weight of their Shot, Demenſions of Cartridges, Ladles, &c.

You are to take notice that the Demenſions of Cartridges and Ladles mentioned, are as when compleated and fit for uſe; you are therefore to allow ſomething more in breadth and length for your Paper and Canvas, for ſewing and paſting, and for the bottoms, for your Ladle about an Inch in length, for nailing it to the head.

Natures and Proportions of Guns, &c.

Names of Guns	Diameter of the Bore.		Powder for Proof.		Powder for Service.		Weight of Shot.		Ladles Length.		Ladles Breadth.		Cartridge Length.		Cartridge Breadth.	
	Inch.	lib.	lib.	lib.	lib.	lib.	lib.	lib.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
Cannon of 8 Inches—	8	30	23	63	23	16½	16¼	24	23	16½	16¼	16¼	16¼	24	16½	16¼
Cannon of 7 Inches—	7	24	18	42	18	15¼	16	21	22¼	15¼	14¼	14¼	14¼	21	15¼	14¼
Demy Cannon—	6½	20	15	32	15	12½	14½	19	22	12½	14½	14½	14½	19	12½	14½
Culvering —	4½	14	10	18	10	11	15½	16½	20	11	17½	17½	17½	16½	13	10½
Demy Culvering —	4T	9	7	9	7	9	17½	13	16¼	9	14½	14½	14½	13	10½	10¼
Saker —	3T	5¼	4	5¼	4	6½	12½	10½	15	6½	12½	12½	12½	10½	7½	7½
Myſion —	3½	4	3	4	3	6	10	10¼	12½	6	10	10	10	10¼	7½	7½
Falcon —	2½	2¼	1½	2¼	1½	5	11½	6T½	11	5	11½	11½	11½	6T½	6T½	6T½
Falconet —	2½	1	1	1	1	12	14¼	16¼	22	12	14¼	14¼	14¼	16¼	13T½	13T½
24 Pounders —	5T½	17	12	24	12	11	16¼	14¼	20	11	16¼	16¼	16¼	14¼	12¼	12¼
12 Pounders —	4T½	10¼	8	12	8	10	14¼	10¼	18	10	14¼	14¼	14¼	12¼	10¼	10¼
8 Pounders —	4T½	8	6	8	6	8½	11	8	16¼	8½	11	11	11	10¼	7½	7½
6 Pounders —	3½	6	4½	6	4½	6¼	11	7½	14	6¼	11	11	11	7½	7½	7½
3 Pounders —	2½	3	2	3	2	3	11	7½	14	6¼	11	11	11	7½	7½	7½

The Diameter of all Round Shot is a quarter of an Inch lower than the Bore of the Gun.

Formers for Cartridges.

A Former or Mould to make Cartridges on, is made of good seasoned Wood, and turn'd very smooth; and the Diameter is to be $\frac{1}{5}$ part lower then the Bore of the Gun, and six Inches longer than the Cartridge. Those employed in making of Paper-Cartridges must not paste or sew them too tite on the Former; to prevent tearing your Cartridge when you draw it from the Former. You must also take care you do not make your Cartridges too high, to prevent jamming it in the Gun, when you Load it; this may burst your Cartridge, and give you trouble to put your Powder home into the Chamber, by the Rammer; all which will retard your Service in firing quick.

Scantling of Cordage for Breeching, &c.

Some Book-learn'd Seamen pretend to tell you, that old Hawfers, and twice-laid Stuff, is fit for Breechings and Tackles; But I utterly deny that Assertion. And every Man that understands the great strain that Guns force upon their Breech, &c. in bad Weather, will desire the best Cordage. If Guns give way, it may prove a dangerous Consequence; and therefore those Accidents which will happen by old Cordage, must be prevented by having good New Cordage, but not of twice-laid Stuff.

The proper Size of Cordage for Breeching is as follows, to Cannon of 7, Demy Cannon, 24 Pounds, and Culvering, from $6\frac{1}{2}$ Inches to 5 Inches; for 12 Pounds, Demy Culvering, and Eight Pounds, from $4\frac{1}{2}$ Inches to 4 Inches; for 6 Pounds, Saker, and Mynion, from $3\frac{1}{2}$ Inches to 3 Inches. Some small Guns on Quarter-decks require only Tackles.

When

When new Ships are fitted for Sea, they are supplied generally with New Cordage, which the Gunner cuts out for Breechings, and Tackles ; and such, when return'd from Sea into the Stores, should be set apart for the same Guns, which may be supposed to be us'd again in the same Ship.

If this Method be not practis'd, it will create a great trouble to Gunners, that are often supplied with Breechings and Tackles ready fitted, being return'd from some other Ship, and distinguished as servicable, by Clerks, who neither know the Scantling, or use of such Materials. It therefore behoves every Gunner that receives them, to examine their Lengths and Goodness.

Cordage for Tackles is never used above the Size of 3 Inches, and the length of every Tackle must be $3\frac{1}{2}$ times longer than your Gun : You must fix good sound Blocks with good Sheaves, that your Tackles may run easy at the Guns reverse.

The length of a Breeching must be twice and half longer then the Gun, and you must be careful in preventing their being gaul'd, by the Guns Motion in Weather.

Rope-Spunges.

This Spung is used within Board, because your Staff-Spung cannot, unless your Gun be along-Ships, which will hinder the Service of your Guns on each side. When you cut your Rope for this Spung, you must serve it well with Spun-yarn, or otherwise, which will stiffen it ; or else you cannot ram your Powder and Shot. It also preserves your Rope from perishing by the Moist Sulpherous Matter which remains in the Gun, by often firing. You must fix on your Rammer, and Spung-heads, at the ends, nayling them with Copper Nails ; let your Sheep-Skins be well wool'd, so will the Gun be better spunged.

The

The size of Rope for these Spunges is as follows.

For Cannon of 7, Demy Cannon, 24 Pounders, and Culvering, six Inches and half Rope; for Guns under these six, $5\frac{1}{2}$ and $4\frac{1}{2}$.

You must cut the Rope for Spunges for great Guns, from 2 to $2\frac{1}{2}$ Diameter of the Bore longer than the Gun, and for smaller from $2\frac{1}{2}$ to $3\frac{1}{2}$ longer; this allowance is for using them more ready, being longer than the Gun.

Your Ladle fixt on a Staff is us'd very seldom, unless a Cartridge break in drawing by the Worm, or some other Accident; then you must draw the Powder by the Ladle, or if your Shot ride or jam, it is commonly drawn by the Ladle.

Cases of Wood.

Cases of Wood, are made to carry Cartridges secure from Fire, they are made something longer than the Cartridge, with a Head or Cover to the Top. It is necessary every Ship be allowed such a Number, that Powder may not be wanting at the Guns; no Care can be too great in using of Powder; for the least Accident by firing Powder disorders Men in time of Action.

Budy-Barrels are very necessary to be plac'd near your Guns, which will contain 3 or 4 Rounds for a Gun in each Barrel, they are cover'd with Leather, and secure from Fire.

The following Inventory of Gunners Stores, being what are used in His Majesties Service, I thought it convenient to show the Method; that every Ingenious Officer, and Practitioner, may know the Custom, or Allowances for Ships of all Rates: and that it might facilitate the trouble of Gunners, who first engage in the Office of a Gunner: As for Guns allowed at one time, may not be another; but you will find all other Petty Emptions continue their same allowance, some alterations

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Gu
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Ar

Brass or Iron Ordnance, for

Ship Carriages, for

terations I have made as being more material for the Gunners use, and proper for the King's Service. The reasons why I do it, shall signify, which you shall find hereafter.

An INVENTORY of Ordnance, Carriages, Powder, Shot, and all Stores allowed on Board His Majesties Ships of all Rates, in time of War, according to the Custom of the Tower.

Names of Guns.	1 st	2 ^d	3 ^d	4 th	5 th	6 th
	R ^t .	R ^t .	R ^t .	R ^t .	R ^t .	R ^t .
Brass or Iron Ordnance, for	Cannon of 7---	22	—	—	—	—
	Demy Cannon—	—	22	24	—	—
	Culvering---	18	30	30	—	—
	Demy Culvering	24	—	—	24	20
	Saker-----	12	36	22	12	14
	Mynion-----	—	—	4	—	—
	Falcon-----	—	—	—	—	4
	24 Pounders---	24	—	—	22	—
	12 Pounders---	—	—	—	—	—
	8 Pounders---	—	—	—	—	—
	6 Pounders---	—	—	—	—	—
	3 Pounders---	—	2	—	2	6
						4
Ship Carriages, for	Cannon of 7---	22	—	—	—	—
	Demy Cannon—	—	22	24	—	—
	Culvering---	18	30	30	—	—
	Demy Culvering	24	—	—	24	20
	Saker-----	12	36	22	12	14
	Mynion-----	—	—	4	—	—
	Falcon-----	—	—	—	—	4
	24 Pounders---	24	—	—	22	—
	12 Pounders---	—	—	—	—	—
	8 Pounders---	—	—	—	—	—
	6 Pounders---	—	—	—	—	—
	3 Pounders---	—	2	—	2	6
						4

Names of Stores.		1 st R ^t .	2 ^d R ^t .	3 ^d R ^t .	4 th R ^t .	5 th R ^t .	6 th R ^t .
Round Shot, for	Cannon of 7--	880					
	Demy Cannon--		880	960			
	Culvering--	720	1200	1200			
	Demy Culvering	960			960	800	
	Saker--	480	1440	880	480	560	800
	Mynion--			160			160
	Falcon--						
	24 Pounders--	960			880		
	12 Pounders--						
	8 Pounders--						
	6 Pounders--						
Dead Headed Ham- mer Shot, for	3 Pounders--		80		80	240	240
	Pound Shot--	6000	4000	3000	2000	500	
	Cannon of 7--	132					
	Demy Cannon--		132	144			
	Culvering--	108	180	180			
	Demy Culvering	144			144	126	
	Saker--	72				96	120
	Mynion--						
	24 Pounders--	144			132		
	12 Pounders--						
Tin Cases fill'd with Musquet- Shot. For	Culvering--						
	Demy Culvering	240			240		
	Saker--	120	360	226	85	140	200
Bars of Iron--		500	430	300	180	90	
Hand-granadoes		200	140	100	70	40	
Fuzes for them--		240	160	115	80	50	

Ladders and Sprnges, for

Cases of Wood, for

 Funn
Pow
Mat
Snap
Blun
Musq
Post
Band
Cart
Musq
Flint
Long
Short

Ladder

(33)

Names of Stores.	1 st	2 ^d	3 ^d	4 th	5 th	6 th
	Rate. la. sp.	Rate. la. sp.	Rate. la. sp.	Rate. la. sp.	Rate. la. sp.	Rate. la. sp.

Cannon of 7---	4	6				
Demy Cannon---		4	6	5	7	
Culvering---	3	4	6	9	6	9
Demy Culvering---	4	7			4	6
Saker---	3	4	7	10	4	6
Mynion---			2	2		
24 Pounders---	5	6			4	6
12 Pounders---						
3 Pounders---			1	1	1	1
Ladle Staves---	50	40	34	24	14	08

Cannon of 7---	36					
Demy Cannon---		33	36			
Culvering---	27	45	45			
Demy Culvering---	36			36	30	
Saker---	20	54	33	18	21	30
Mynion---			6			6
24 Pounders---	36			33		
12 Pounders---						
3 Pounders---		3		3	9	9

Funnels of Tin---	5	3	3	2	2	1
Powder in Barrels---	500	315	307	175	110	55
Match, Hundred weight---	15	11	9	5	3½	2
Snaphanfes---	150	120	80	60	40	30
Blunderbuffes---	10	8	5			
Musquetoons---	10	8	5	8	6	4
Postols, pairs---	50	30	20	16	10	8
Bandaleers, Collers---	50	30	26	20	15	10
Cartouch-Boxes---	150	120	85	65	45	30
Musquet Rods---	50	40	36	24	18	12
Flints---	5000	4000	3000	2000	1500	1000
Long Pikes---	50	36	24			
Short Pikes---	36	24	24	24	16	18

D

Names

Ladles and Spinges, for

Cases of Wood, for

6th
R.800
160

240

6
6

120

40
20

90

40

50

Lad

Names of Stores.		1 st	2 ^d	3 ^d	4 th	5 th	6 th
		Rate.	Rate.	Rate.	Rate.	Rate.	Rate.
3 Pikes	—	36	24	24	24	16	
Bills	—	18	12	12	10	6	4
Hatchets	—	70	60	45	30	15	12
Swords	—	70	60	40	30	20	15
Hangers	—	70	60	40	30	20	15
Musquet Shor, Hund. wt.	—	15	11	8	6	3½	2
Pistol Shor, Hund. wt.	—	3½	2½	1½	1	¾	½
Sheet-lead, Hund. wt.	—	5	3½	2½	2	1½	1
Aprons of Lead	—	100	90	80	60	40	30
Crows of Iron	—	100	90	80	60	40	30
Tackle-hooks, pairs	—	60	50	40	30	20	15
Ladle-hooks, pairs	—	70	60	50	40	30	20
Linch-pins, pairs	—	55	45	40	30	20	10
Port-hooks	—	100	90	70	50	40	30
Spikes	—	400	300	250	200	150	100
Fore-lock keys, pairs	—	150	100	90	70	50	40
Sledges	—	4	3	2	2	1	1
Great melting-Ladles	—	3	2	2	2	1	1
Small Ditto	—	4	3	2	2	1	1
Nails of Sorts.	40 Penny	500	300	250	100		
	30 d.	500	400	350	200		
	20 d.	400	400	400	400	350	200
	10 d.	1000	1500	1000	500	500	300
	6 d.	3000	2500	1500	1500	500	300
	4 d.		1000	1000		500	
	3 d.	2500	2000	1000			500
	2 d.	5000	4500	3000	3000	1500	1000
	Copper-Nails	800	500	400	300	150	100
Extra.	Beds	120	100	90	70	45	35
	Coynes	240	200	180	140	90	70
	Cannon and Demy Can.	8	5	5	4		
	Culvering and Demy Cul.	8	5	4	4	4	
	Sak r and Mynion	8	5	3	2	2	4

(35)

Names of Stores.		1 st	2 ^d	3 ^d	4 th	5 th	6 th
		Rate.	Rate.	Rate.	Rate.	Rate.	Rate.
Trunks.	Ordinary, pairs—	15	10	8	5	3	
	Extraord. pairs—	15	10	8	5	2	
Tam- peons.	Great ———	1000	400	400	300	100	
	Small ———	1000	300	200	100	150	200
Heads & Ram- mers.	Great, pairs—	50	30	30	25		
	Small, pairs —	40	20	15	10	25	12
Formers	Great ———	10	5	4	4	2	
	Small ———	8	5	4	3	3	4
	Budg-barrels ———	7	5	4	3	2	2
	Tann'd-hides ———	24	15	12	8	6	4
	Sheep-Skins, Dozens —	8	5½	5	4	2½	1½
	Baskets ———	50	40	36	24	18	12
	Spare-hoops, pairs—	4½	3	2½	2	1	½
	Canvas, Ells ———	200	100	90	80	50	50
	Paper-Royal, Rheams—	15	10	9	7	4	2½
	Fine-Paper, Rheams —	2½	2	2	1	½	8qr.
	Oyl, Gallons ———	10	7	6	4	1½	3
	Tallow, Hundred wt.—	3½	2½	2	1½	3	½
	Starch, Pounds ———	24	15	12	10	8	5
	Needles, Dozens ———	24	15	12	10	8	5
	Thread, Pounds ———	24	15	12	10	8	5
	Lanterns, Ordinary —	10	8	6	5	4	3
Ditto Extraordinary of Tin, one to each Ship.							
	Dark ———	3	2	2	1	1	1
	Muscovia Lights ———	5	3	2	2	2	2
	Ditto Extraordinary —	4	3	2	2	0	
	Wad-hooks ———	20	15	12	8	5	3
	Handcrow-Leaves ———	140	110	100	75	50	40
	Rope-Sponges ———	100	90	80	60	40	30
	Powder-horns ———	150	120	100	80	50	40
	Priming-Irons ———	150	120	100	80	50	40

Names of Stores.		1 st Rate.	2 ^d Rate.	3 ^d Rate.	4 th Rate.	5 th Rate.	6 th Rate.
Linstocks		25	20	15	10	6	4
Marlin, Pounds		80	60	56	45	30	20
Twine, Pounds		25	15	12	10	5	3
Wyer, Pounds		20	10	10	8	4	3
Hand-Screws		3	2	2	1	1	
Tarp Rope of	7 Inches, Coyle	1					
	6 $\frac{1}{2}$	1	1	1			
	6				1		
	5 $\frac{1}{2}$	1	1	1			
	5				$\frac{1}{2}$		
	4 $\frac{1}{2}$	1		1		$\frac{1}{2}$	
	4		1		$\frac{1}{2}$		$\frac{1}{2}$
	3 $\frac{1}{2}$	1				$\frac{1}{2}$	
	3	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{1}{2}$	1	$\frac{1}{2}$
	2 $\frac{1}{2}$	3	2		1	$\frac{1}{2}$	$\frac{1}{2}$
	2	2	2	2 $\frac{1}{2}$	1	$\frac{1}{2}$	$\frac{1}{2}$
Breeching		100	90	80	60	40	30
Tackles		200	180	160	120	80	60
Port Tackles, Coyle		7 $\frac{1}{2}$	6 $\frac{1}{2}$	5	2 $\frac{1}{2}$	1	1
Junck for wads, hund. wt.		70	50	45	30	20	15
Cartridges of Parchments.	Cannon of 7	660					
	Demy Cannon		660	720			
	Culvering	540	900	900			
	Demy Culvering	480			480		
	Saker	240	720	440	240	320	400
	Mynion			80			
	24 Pounders	720			660	400	
	12 Pounder						
3 Pounders			40		40	80	80
Smiths Vices		2	1	1	1	1	
Putty and Emory, Pounds		5	3	2 $\frac{1}{2}$	2	1	1
Files of Sorts, Dozens		1 $\frac{1}{2}$	1	1	6	4	4

The Duty and Qualification of a Gunner.

Of all Duties committed to a Warrant-Officer, this of a Gunner requires the soberest and greatest Care, and besides his being vers'd in the Theory yet he ought to be well grounded in the Practick part.

His Prudent and Sober Behaviour, when he was employed under judicious Gunners, must be well certified, before he be admitted to have a Warrant. A Ship may have a brave Commander, with other good Officers, but a Careless Gunner will soon destroy Ship and Men.

Every Person recommended to be a Gunner, must be examined by the Master-Gunner of *England*, whither he be knowing in the Practical use of Ordnance. For it has often happened that Gunners of Ships have been commanded on Land-Service, upon extraordinary Occasion.

This careful Method would soon oblige Men to behave themselves soberly; especially such as expect Preferment.

I hope it may not be amiss to point at the Errors formerly committed (and that is preferring of Cooks, and others by Favour, that could not write) to be Gunners: Such Persons may be Honest, and Sober, but not fit to be employed in the Office of a Gunner.

When a Gunner has past his Examination, and the Ship of which he is made Gunner is order'd for Sea, he must then attend the Captain appointed to Command her.

First the Gunner is to acquaint the Captain what Guns have been formerly allowed the Ship, and whether it may be proper that these Guns or part of them shall be exchanged, as being too weighty for the Decks, or such other Faults, as by Exchange may be more serviceable for the Ship.

After he has consulted with the Captain touching this matter, and the Captain approving of the same, then the Reasons must be signified to the Admiralty, and if agreed upon, the Lord High Admiral signifies his Pleasure to the Officers of the Ordnance, that such Guns shall be Exchang'd, being for His Majesty's more immediate Service: When the Office of Ordnance, has appointed what Guns are for the Ship, the Gunner must then examine, and see they are not Flaw'd or Honey-Gomb'd, and that their Lengths are proper; that by their Reverse they may be commodiously Hous'd within board, and the Muzzles rainge in a handsome Line without board.

The Gunner must see his Carriages fitted to his Guns having regard to the Lengths, and height of the Ports, and the Iron work be good.

That the Extreemes, be sound and strong, and the Trucks have their due Scantling, both as to their breadth on the Soul, and their height; this causes the Gun to Reverse more easy and steddly.

It may be supposed that the Ship has now near her complement of Men, and the Gunner has made choice of a good careful Mate, Yeomen, and Quarter-Gunners, and such others as are necessary for the Gun-room Crew: after this he attends the Board of Ordnance to receive his Stores, if the Voyage is like to be long, and the Ship bound, to such Ports, where some Neecessaries (if wanting) cannot be provided, He must then sollicite for some addition of such Stores; viz. Tallow, Oyl, Starch, and such like, which are Stores of common use.

He must be sure to receive the Ladles and Spunges of a proper height for the Guns, and likewise the Formers for Cartridges, and Spare-heads and Rammers, and that they are free from the Worm.

That the Spare Cordage, with Breechings and Tackles be of good Stuff, and not of twice-laid Stuff.

That

That the Fire-Arms be in good repair, having good Locks and sound Stocks ; as for the Barrels, there is seldom any Scruple to be made against them ; but if your Locks prove ill, your Musquets are useless ; for few Armorers know how to mend a Lock. But in my Opinion that Fault ought to be repair'd, by good workmen being employed, instead of such as are useless, unless it be for oyling and cleaning.

The Sheep-Skins which you receive must be well Wool'd, if not, your Sponges will be of little Service.

The Gunner having strictly observed what is here directed, being such Stores as are more Material for the Guns, and having likewise received all other Stores allowed him, He then signs an Indenture or Obligation, that he has such Stores in his Custody, for which at the Return of the Ship, he is to give a just account of all Stores by him expended, signed by the Captain, and such other Officers, who by the Kings Instructions, are also to sign.

After the Gunner has brought all his Stores on Board, except Powder, which is not put on Board till the Ship be clear from her Morings, or fallen down to some place remote from Docks, &c. He then mounts his Guns, fixing them with their Breechings and Tackles, disposes his Arms in Decent and Proper places, as in the Gun-room, Great Cabbin, and Stoes away all other things fit for immediate use, when Occasion requires.

When the Powder is brought on Board, the Gunner must see that no fire be in the Cook-room, nor no Tobacco-Smoakers be allowed, and then take care to have it securely and dry Stoed, covering it with Tann'd-Hides. He must secure the Parchment, Canvas and Paper for Cartridges, from any Damp Place, and free from Rats ; hang up his Cases of Wood, that they may be kept free from splitting or breaking.

All things being in their proper places, the Gunner must then cut out his Cordage for Breechings and Tackles,

Tackles, if not supplied with a full Complement of the same, he must make, serve and coat his Rope Spunges, fits his Formers for making Cartridges, and then imploy his Crew in making Cartridges, and placing Garlands for Shot. He must appropriate a fit Number of Men to each Gun, fixing their Names over each Gun, making one as Foreman or Director in managing the Gun.

I hope what has been already recommended, may be sufficient to direct any Person desirous to be employed in his Majesties Service ; the Rules being Practical, and not derived from House-scribbling Sea Men, who have no Foundation.

Of the use of Ordnance in Action.

This Point is very Material, and ought to be well understood, or otherwise your Guns will do but little Service.

Let it be supposed your Guns are truly Mounted in their Carriages, with good Breechings and Tackles, your Cartridges fit, and all other things at hand (this is all truly necessary.) But true pointing and firing must afront your Enemy.

Secondly, If you leave your Guns to the Government of Sailors, you must expect half the Shot Fired and spent in vain, and sometimes your Gnns broke ; you must therefore restrain that Error, and allow no firing, but when Command is given, and the Guns laid to such a Position that they may do Service.

Thirdly, You must take this for a Rule, that a single Shot well plac'd, is better than rashly loading a Gun with a Round and Double Head Shot : Thus are Guns often broke, (and if not) cannot do much Service, if you were close on Board of your Enemy, your Shot being too weighty for the Powder.

Fourthly, When you design to shoot Double head Shot,

Shot, be sure you put no other Shot into your Gun. Neither must you fire far, if you do, your Shot will be buried in the Sea. There are many idle Fellows, think that a Crow with a Shot does great Execution against a Ships side : But this Supposition, is no other than wronging the King, and deprives you of a Necessary Utensil for traversing your Guns.

Fifthly, You must take Care in spunging your Guns, to prevent Accidents which often happens by pieces of Cartridges, remaining either in Hony-Combs, or in the Chamber ; and also when your Guns are warm with much firing, to use a wet Spung.

Sixthly, There is a common conceiv'd Opinion, that Guns when warm must have an abatement of Powder, which is call'd gelding a Cartridge. But this Cheat all Commanders must strictly observe, as well for his Majesty's Service, as their own Honour : For if Powder is abated, you must add Courage and Resolution, and fight Close, if not, your Guns will not perform the Service required.

I must confess Iron-Guns being more Subject to Accidents than Brass, should have more care taken of them in firing : And if Men were forbid firing till there was just Reason, Guns would have respite and time to cool. Besides it is not common that a Ship is forc'd to fight at so great a disadvantage as to make use of Guns so very fast, as not to allow some Interval of time, which may prevent such extraordinary Heat that may break her Guns. And that this Notion of gelding of Cartridges may not be practis'd, I will engage that an Iron Gun may be fired seven times, with her due allowance of Powder, without respite ; and I have seen a Culvering fired fifteen, without using a cool Spring ; but this was in Land-Service.

There are small Iron-Shot that weigh a pound each ; These Shot are of excellent Service either for lower, or Guns of Middle Tiers : You may shoot 20 or more
out

out of a Demy-Cannon, and so in Proportion to Culvering.

Tin-Cases fill'd with small Shot, or vulgarly call'd *Partridge*, are of excellent Service for clearing of Decks, and you may shoot two out of any Gun the Cases are design'd for; but your distance must not be above sixty yards, neither must you use a Round-Shot with a Case: For the Shot spoils the Service of the small Shot, by its violent dispersing them.

Bars of Iron and Bur-Shot were intended for cutting Rigging, and clearing Decks, and must not be fired far from your Enemy.

There are many careful Observations to be made, as to the use of Guns on board, and Practice will perform them; if care be taken by a stirring and vigilant Gunner: And since His Majesty's Service may be encouraged, I therefore recommended the following Methods for instructing of Sailors, &c. at Leisure times, before the going out of Ships.

That a Platform be made in every Sea-Port, where His Majesty's Ships lie, and Guns mounted on Ship Carriages, equipt as on Board with Tackles, &c.

That Gunners, and Mates, Exercise the Sailors at the Platforms, by the following composed Rules, which I have carefully set down, and easy to be understood; and though there are many words of Command, yet it is truly necessary they be all known: And then in time of Action Men may take the shortest and readiest way in governing and firing their Guns.

It is necessary that the Lieutenants, and all other Gentlemen that design to serve at Sea, be present, to be instructed in the words of Command, that they may Exercise on Board. And by this Method will be able to correct the Errors of Pointing and Firing of Guns in time of Service, which will undoubtedly save His Majesty great quantities of Ammunition, that is fired to waste.

Your

Your Guns being mounted on the Platform, fitted with all things, as on board, you must then proceed to load as followeth, by these words of Command.

The Master Gunner Commands.

Silence.

Handle your Rope-Spunge.

Put your Spunge into your Gun.

Take of your Apron.

Stop the Vent with your Thumb.

Put home the Spunge to the Breech.

Turn it about thrice.

Draw forth the Spunge, keep it turning.

Strike it on the Muzzle.

Exchange the Spunge for the Rammer.

Handle your Cartridge.

Put it into the Gun.

Handle your Wadd.

Put it into the Gun.

Handle your Rammer.

Put it into the Gun.

Ram home Wadd and Cartridg.

Give three strokes.

Examine with your Priming Iron.

Withdraw your Rammer.

Handle your Shot.

Strike it on the Muzzle of the Gun.

Put the Shot into the Gun.

Handle your Wadd.

Put it into the Gun.

Ram home Wadd and Shot.

Give too strokes.

Draw forth your Rammer.

Lay down your Rammer.

Handle your Priming Iron.

Prick or break your Cartridg.

With-

Withdraw your Priming Iron.
 Handle your Powder-Horn.
 Unstop your Powder-Horn.
 Hold up your Horn.
 Prime your Gun, carrying the Powder forward.
 Stop your Powder-Horn.
 Join your left hand to the small end.
 Bruise your Powder.
 Return your Horn.
 Cover the Priming with the Apron.

Your Guns are now loaded, and ready to fire
 at Command. The Gunner says,

Man your Tackles.
 Handle your Crows and Hand Spikes.
 Hall up the Ports and belay them.
 Run out the Guns.
 Lay the Guns to pass in the Ports
 Point straight.
 Point to Dismast.
 Point to Wind and Water.
 Handle your Match.
 Blow your Match.
 Take of your Apron.
 See all things clear of the Reverse.
 Fire.

Now are your Guns fired and Reverse within Board,
 you must then let fall your Ports, to prevent Small-Shot.

Let it be supposed that your Ship is at Sea, and hav-
 ing her Guns Loaded and Stoed. The Man at Top-
 mast-head cries *a Sail upon our Weather Quarter*, and *She*
lays her head to us; The Captain Commands *a Clear Ship*,
all Officers to their Posts, the Gunner and Mates, Com-
 mands each Crew, viz.

Draw

Draw your Cleats and Spikes.

Unlash your Gun.

Handle your Crows, and hand Crow-levers.

Strike open the Ports.

Haul up the Ports, and belay them.

Run out the Guns.

Lay your Gun right in the Port,

Unlash your Apron and take it off.

Draw the Fidd of the Vent.

Handle your Priming-Iron.

Prick your Cartridge.

Handle your Powder-Horn.

Prime the Gun.

Bruise the Powder,

Cover the priming with the Apron.

See the falls of the Tackles clear of the Trucks.

Handle your Match, and

Blow your Match.

Take off the Apron.

Fire.

Your Ship is now in a Posture fitting to engage the Ship bearing down, but you soon find her to be a Freind, which only gives you occasion of saluting her. The Gunner must then take Care to draw the Shot of such Guns, designed for that Purpose ; when this is performed, and soon after the Weather appears Cloudy, and the Wind begins to blow, and there is likely to be bad Weather : The Gunner with his Mates and Crew are to take care the Guns be well secured and lashed. He Commands as followeth.

Handle your Crows and Hand-spikes.

Run in your Guns.

Let fall your Ports and lash them.

Put

Put a Tampeon into the Muzzle of the Gun.

Draw the Coines from the Gun.

Run home the Gun with the Muzzle to the upper Cell of the Port.

Hall taut the Breechings and Tackles, and lash your Gun.

Take off your Apron.

Blow off your Priming.

Stop your Vent with a Fidd of Cork, and Tallow it well.

Lash on your Apron.

You have now your Guns secured. But the Ship lying in the Troff of the Sea, rould much; now to prevent the great strain upon the Breechings and Tackles, which prejudices the Ship sides, you must therefore Spike and Cleat your Trucks, that the Carriage can have no Motion.

In my Opinion no lower Guns ought to be loaded till occasion requires, lest Accidents happen by some careless or Idle fellow betwixt Decks, and if a Gun should fire it might do great Damage.

Having explained the Duty of a Gunner and given such Practical Rules for managing his Business, I thought it necessary to acquaint him how to fit a Fire-ship with all Materials ready for Service.

Fitting of Fire-ship's formerly was much more chargeable than now practised, in regard Materials demanded were in two great a proportion, especially Camphire, with Spirits of Wine, Brandys, and Oyls of sorts these may all be spared, except Spirit of Wine, which is used for making quick Match and Linseed Oyl.

The first thing to be observ'd, is, That your Ship to be fitted be a sound Ship, her Decks good, and her Seams well Calkt and Paid, her Ports hung on the lower Edge or Cell. This is the Life of your Work. For if your Ship will not endure Weather, your Works will be

be all spoiled, and creates further Charge and Trouble in refitting. Besides when you have reason to use her, she is altogether unfit, which may prove of ill Consequence.

When you are thus provided with a sound Ship, You must then be supplied with the several Particulars following, which are proper for making your Composition, the quantities I have not specified, because that Point must be judged, by the bigness of the Ship.

Materials.

Powder Meal'd.
Ditto in Corn.
Salt Petre refined.
Brimstone in Powder.
Rozin.
Pitch.
Tar.
Tar-Barrels.
Dry Reed.
Shavings of Deal.
Birch Twigs dry.
Fire-Trunks.
Drifts of Iron.
Canvas.
Paper.
Twine.
Marlin.
Wyer.
Thread.
Needles.

Pack-Needles.
Lawn Seives.
Ditto of Hair, with tops
and botoms.
Copper Kettles.
Forks for dipping your
Canvas, &c.
Morters of *Lignum Vitæ*
with Pestles.
Wooden Mallets.
Tann'd-Hides.
Sheep-Skins.
Cotten-Week.
Spirit of Wine.
Linseed Oyl.
Slit Deals to make your
Channels for the quick
Match, &c.
Glew.

To fit or prepare your Ingredients, you must erect your Copper and Kettles in some convenient place free from Wind or disturbed by Weather, taking great care how you boyl your Tar, Pitch, &c. and when you dip your

your Canvas or Sheets, with the reed and shaving, that you see the fire so secure that no part that drops may fall on the fire, which Accident may ruin your works, and destroy your self.

You are to cut your Canvas into pieces of two yards long, make up your Shavings into round Bundles of 16 Inches, Diameter Birch-twigs into small Faggots, 3 Foot long Reed into Bundles of 7 or 8 Inches thick, these are all to be dipt into the Mixtures following.

To every 100 l. of Pitch 150 l. of Tar and 50 l. of Rozine, Linseed Oyl 20 Gallons add 50 l. of Brimstone. This being well boild and incorporated, dip your Sheets, Shavings, Reed and Faggots. Then strow on them Meal'd Brimstone, and Meal'd Powder mixt: and then hang them up to dry. If you find your Composition to thick add Tar. All other Combustible Matter, as Tow must be dipt and strowed as before.

To prepare your Match.

You must take two Gallons of Spirit of Wine or good Brandy, add to it two quarters of Stale Urine boil these together with 10 l. of refined Petre, till it is desolved then put into it your Cotten-Week and let it steep till it boils easy for a quarter of an hour, in which time the Petre will be forc'd into the body of the Cotten. Then squeeze it as dry as you can, and roul it in Mealed Powder, and hang it up till it is almost dry, then roul it again in Mealed Powder, and when dry, is fit for Service, and must be kept dry.

When you fit your Truncks, first woold them with Tar'd Marlin, to prevent their splitting in driving. The contrary end to the Spikes, there is hole about an Inch wide, through which the fire may Pass or Spout out. These Truncks are used sometimes to keep off Boats, and then a staff is fix into this hole, and fire is given to the Spike ends and by striking it into the Boat, or under

der the Bow or Counter of a Ship may probably set her on fire.

To fix these Truncks take 50 l. of Meal'd Powder : 10 l. of Meal'd Brimstone, 10 l. of Salt-petre refined. 20 l. of Rozin Meal'd, mix these well together and fill the Truncks, by driving them hard, but not so hard as a Rocker : before you fill them up to the Spike end, lay some quick Match, and then drive only Meal'd Powder and Brimstone mixt ; when it is fill'd, then dip your Trunck into the same mixture which you did the Sheets, &c. and then your Trunck is fit for Service. I know some Persons have sav'd this trouble of driving dry Composition and have fill'd them with boiled ; but the dry is much better and a stronger fire.

To make your Gutters and placing them.

Your Gutters are made of half Inch Deal Boards about 3 Inches square, and well paid with Pitch within and without. They are plac'd fore and aft on the Ships side to convey the fire. About 3 yards distance in these Gutters must be a little dore to open and shut, the better to place your Match, which must be drawn in and out by a Marlin Line stretch't through the Gutter. Thus will your Match and Traines be kept dry ; the same form of Gutters may be made to other parts of the Ship and to carry fire to the Tops. One thing more I think very proper to be plac'd about 3 yards distant in these Truncks, which are small Rockets, and when on fire flies amongst the fire Works and will add to the quick firing of the Works.

Having directed you how to prepare your Works, you must now get Tar Barrels placing them along the Ship sides and in other convenient places : Then fill them with shayings dipt, Reed and Birch Faggots, and Tow, and hang up your sheets over them ; all which will be set on fire by the Traines before spoken off.

You must never Prime your Ship but upon immediate occasion to prevent Accidents.

Your Ship being compleatly fitted, you must be very Circumspect how to preserve it from fire and water, both being Enemies to your Service. The first may burn your Ship at Sea, and destroy your Men, and the last spoil your Works, and give you charge of refitting.

An Appendix.

Having considered that Gunners of Ships and others employed under them, have been upon some extraordinary Service commanded into Land-Service, I therefore thought it necessary to lay down some practical Rules to be observed in the performance of their Duty. And have likewise set down a direction how to proportion or furnish, a small Train of Ten Guns, with Ammunition and other Habiliments of War necessary for a March, into Field-Service, from which Directions, Practice will instruct a Judicious Learner, how to furnish a Train of Artillery of a greater Number of Ordnance, either for Field Service, or for Battering Guns.

Of Ordnance for Land-Service.

Ordnance for Land-Service are of Different kinds, such as are for Garisons, are, or ought to be of Iron, and made of good Lengths, and well fortified, that so your Enemy may be annoyed at a considerable Distance, to prevent their near approaches.

Ordnance for Service of the Field and Battering must be of Brass, being less subject to Casualties, and are more Proper for Marching and general uses: Besides if a Gun happen to split, the same Mettle is ready to be converted to a Gun, for the same Service.

Ordnance for Field-Service, are used according to the Opinion of the General, having regard to the Ways
and

and Passages in the Countries through which they are to March. However Ordnance from 12 Pound Ball to Saker, which is $5\frac{1}{4}$ pound, are the most Proper Artillery for open Countries. If your Country be Hilly or Deep ways, and your Expedition requires a quick March, you must use Guns of small Demensions, as Myñion of 4 l. Ball, and 3 Pounders.

Ordnance for Battery must be of larger Demensions, such as Demy-Cannon, 24 l. Ball, 18 l. Ball and 16 l. Ball; the last are much used in foreign Service: The Lengths of these Guns never exceed 10 foot, and are often not above Nine foot, but well fortified. Having spoken of what Guns are proper for Garisons and Field-Services; you are now to observe the following Directions.

First you are to take Notice, that there is much more trouble in your Duty on Field-Service, in regard every Days March Impleys your Care in keeping your Guns in good order, and that all things belonging to them be at hand, and that your Gunner and Assistances be sober and dilligent in their Attendance and respective Duties.

It is true your superior Officers have the same Care over you. But this must not excuse your Watchfulness: For Diligence will save you a great trouble, obliging all Men that know their Business to be active and ready for Service.

Your Carriages being different from Sea-Service, and daily Marching, must be well observed, whither the Iron-work continue firm, as well on the Bodies, as Wheels, and whither your Extreies be sound, that they be well greased before your March from any Garrison, or Incampment.

That such Waggon, Tumbrels of Ammunition, or Shot-Carts under your Charge be sound in all Degrees, as spoken of before, especially such as have Powder; those must never want good greasing, to prevent firing the Extree

and Nave ; which Accident may Blow up your Powder, and do further Damage to your Train.

That your Ladles, and Spunges, and Worms, be lastht and plac'd on the side of the Carriage of the Gun, and the Lockers that are made in the Train of your Carriage, have more or less Powder and Ball, with other Necessaries as may defend you upon any surprize of Ambushcade, till you can more conveniently have the rest of the Ammunition, which must March near your Ordnance.

As for Cartridges, with all other matters incident to the use of Ordnance, are made as on Board for Sea-Service, and your Care in searching your Guns, and to fit the Formers for making them. But this trouble is generally made easy ; Cartridges being ready made in the Magazines for the Service of your Campaign.

You must be careful in supplying your self with good large Powder-Horns, with good Priming-Irons, and Drifts to clear the Vents of your Guns ; you must likewise have Budg Barrels, Cases of Wood, and Tin-funnels ; all these are necessary to secure Powder from Accidents of Fire, in time of Service,

Handspikes and Crows must be at hand for quick Traversing your Guns. All these Ustensels are the most material about your Guns, either in the Field or on Batteries. All other Emprions are used as in Sea-Service, and therefore need not mention the applying them, having given a full direction of their use.

As for all other Habiliments of War, which you find in the *Inventory* given you for a Train of Ten Guns, will be employed as the General Officers of the Train, or Engineers shall direct ; either for making of Bridges, or repairing of Passes, for Marching the Cannon.

Such Stores as Horse-harness and what are incident to the use of Waggons, Tumbrels or the like are applied according to the Directions of the Officers that have that Charge committed to them.

To

To Proportion your Horses, either for Guns or Wagons, it is generally allowed according to weight as 2 hundred weight to each Horse, allowing the Carriage. This weight is certainly enough, considering daily Marching, with other Hardships Horses must endure. If your ways be Hilly or Extraordinary Deep, you must add to the Number.

You are often oblig'd to make use of Men, and then there is allowed 6 Men for each Horse, as an Equivalent to their Service; but this is very rarely acted unless in Narrow Passages, where Carriages are taken in Pieces and the Cannon and Carriages drawn on Sledges. Many other Contrivances are made use of, to get Guns over Narrow Mountainous Passes.

Upon such occasions as this, a Gunner is oblig'd to be very active, that he may deserve his general Officers Favor.

You are oblig'd every Night in all Encampments to receive Orders from your Principal Officer, or such Officer or Adjutant as shall be appointed to give out Orders. Strictly observing the Sobriety of all Gunners and Matrosses, whither on, or from Duty. That you have your Matches lighted; and secure from Weather; that your Guns be decently plac'd with all Necessaries fitting for Immediate Service, or for quick Decamping.

Having briefly spoken of a Gunners Duty, with Directions in managing himself in a Marching Train, I shall now acquaint him how to Erect his Batteries.

Advancing and Directing of Batteries in former Wars, were far different to our present times; old Authors direct you to place your Batteries two and three hundred Paces distant from the Town besieged, and erected their Batteries extream lofty; this Method was to batter Houses, but that Service was Expensive and tedious; Mortars are more expeditious and far more terrible to the besieged. All Engineers covet to advance their Batteries as near as possible, before they

to a general Battery, which is about 100 Paces : If farther you spend your Shot in vain. At this Distance you will be sure to place every Shot to do the Service required ; and your Enemies Cannon will be soon dismounted, which gives you liberty of being Masters of all Outworks.

Your Batteries must be made on rising Ground to carry off Water, and you must intrench them to prevent water lying within your Works, which will spoil your Ammunition, you must cover your Guns from the Enemy with good fences of Earth, 8 or 10 foot thick, facing your Parrapets in the inside with 3 Inch Planck, nailed to good Posts set into the Ground, so you will always have your Earth stand firm ; without which it will slip down by your Guns firing. If you cannot be supplied with Planck you must make a Fence of Rattling, by Bows, or such like. Your Parrapet must be 9 foot high : Your Ambrazure or Porthole need not be above two foot wide in the inside, and slopt to 4 foot on the outside, which is enough : your Guns having no occasion of being traversed upon the place you design to Batter, the rest of your Guns assisting the said Service. Your Ambrazures need not stand above 10 foot wide from each other. Let your Platforms be well laid and Planck'd, that your Guns may be used with greater Expedition.

Whilst your Battering Cannon are at work, you have some other Batteries commodiously plac'd to divert the Enemy ; these Guns are us'd by skilful Gunners that they may annoy the Enemy the better. Morters are also us'd to incommode the Beseiged, all which gives life to the grand Batteries, and saves Men.

Necessary

*Necessary Rules to be Observed when your Guns
are mounted on your Batteries.*

First that your Powder and Match be securely kept in Different Places, to prevent such Accidents as may deprive you of all your Ammunition at once; and not only that but disorder your Batteries, and give your Enemy reason to make a Salley, and secure your Cannon, or at least spoil them by spiking, or such like Methods.

Secondly, That your Round-Shot, Crows and all other material Stores, lie so in time of Service, that no Shot from the Enemy prejudice them, or cause them to be hurtful to your selves: you must therefore place them below that danger.

Thirdly, You must have Tan'd-hides and Tar'd Paulins to cover your Powder from Weather, and also small Tarr'd Paulins to lay over the Breech of your Guns, in extream Rains.

Fourthly, That you be always provided with good Match, and to preserve it from wet, and likewise prevent it doing any Damage by laying it negligently.

Fifthly, That your Powder-Horns be always fill'd; and good Priming-Irons, Drifts, and Bits, be annexed to the Horn, that if the vent of your Guns want clearing it may be readily performed,

Sixthly, After you have with all the Care imaginable put all things in Order, and you have orders to Play your Cannon against your Enemies Walls, you must then observe whither your Guns will do the Execution intended by shooting by the Dispart Line. (If not) Then find how much you fall short, and so cut your Dispart for your use. This way is a good Direction. But if you observe how your Bed and Coines lie in the Carriage and mark them, and so run out the Gun to

the Port to the usual distance, this will give you less trouble, then placing your Dispart, and you may fire with greater Expedition. Observing sometimes with your Eye some object on the Place you Batter, that your Shot may not be Shot to loss. This is the way which must direct you if you Battery in the Night.

Seventhly, That every Gunner and others imployed on the Batteries behave themselves quietly, without Hurry, laying all things they make use of in their proper Places, so will your Guns perform the Service intended. Least the use of Ordnance in Land-Service may prove something difficult, I therefore have given you an exercise hereafter, which words of Command will make the use more easy to you; and yet little different to that of Sea-Service.

An Exercise for Guns on Batteries.

Supposing them unloaded.

Silence.

Handle your Crows and Hand-Spikes.

Run back your Gun from the Ambrazure.

Draw forth the Tampeon.

Unfid your Vent.

Handle your Ladle.

Put it into the Gun observing to keep the open part upright.

Examine home to the Breech.

Draw forth your Ladle, and discharge it from Filth, &c.

Lay down your Ladle.

Handle your Sponge.

Put it into the Gun.

Stop the Vent with your Thumb.

Put home the Sponge to the Breech.

Turn it about thrice.

Draw forth your Sponge keeping it turning.

Strike

Strike it on the Muzzle.
 Exchange your Sponge for the Rammer.
 Handle your Cartridg.
 Put it into the Gun.
 Handle your Wadd.
 Put it into the Gun.
 Handle your Rammer.
 Put it into the Gun.
 Ram home Wadd and Cartridg.
 Give three strokes.
 Examine with the Priming-Iron.
 Withdraw your Rammer.
 Handle your Shot.
 Strike it on the Muzzle.
 Put the Shot into the Gun.
 Handle your Wadd.
 Put it into the Gun.
 Ram home Wadd and Shot.
 Give too strokes.
 Draw forth your Rammer.
 Lay down your Rammer.
 Handle your Priming-Iron.
 Prick or break the Cartridg.
 Withdraw the Priming-Iron.
 Handle your Powder-Horn.
 Unstop your Powder-Horn.
 Hold up your Horn.
 Prime your Gun, carrying the Powder forward.
 Stop your Powder-Horn.
 Join your left hand to the small end of the Horn.
 Bruise your Powder.
 Return your Horn.
 Cover your Priming with the Apron.
 Handle your Hand-spikes.
 Run home the Gun to the Ambrazure.
 Lay your Gun right in her Carriage.
 Point your Gun to the Object.

Handle your Linstock.
 Take off your Apron.
 Blow your Match.
 Fire.

The Gunners and Matrosses attending the Gunner of each Gun, must have their Hand-spikes ready to heave the Train of the Carriage, when ordered, that so the Gunner may make a quicker dispatch in laying the Gun to pass.

An Inventory or Proportion of Stores; as Guns, Carriages, and all other Habiliments of War, necessary for a Train of Artillery, consisting of Ten Guns for a Marching-Train, or Field-Service.

<i>Particular Stores.</i>		<i>N^o.</i>
<i>Brass Ordnance mounted on Travel. Carriages.</i>	<i>{ Demy Culvering</i>	5
	<i>{ Saker</i>	5
<i>Spare Bodies for Travelling Carriages.</i>	<i>{ Demy Culvering</i>	2
	<i>{ Saker</i>	2
<i>Spare Extreemes barr'd, for</i>	<i>{ Demy Culvering</i>	3
	<i>{ Saker</i>	3
<i>Ditto unbarr'd.</i>	<i>{ Demy Culvering</i>	4
	<i>{ Saker</i>	4
<i>Spare Wheels shod, for</i>	<i>{ Demy Culvering, pairs</i>	2
	<i>{ Saker, pairs</i>	2
<i>Ladles and Spunges for</i>	<i>{ Demy Culvering</i>	3 <i>la. 5sp</i>
	<i>{ Saker</i>	3 <i>la. 5sp</i>
		<i>Cases</i>

*Particular Stores.*N^o.

<i>Cases of Wood</i>	<i>Demy Culvering</i>	6
<i>for</i>	<i>Saker</i>	6
<i>Nails of forts</i>		10000
<i>Hand-spikes</i>		10
<i>Handcrow-leavers</i>		10
<i>Linstocks with Cocks</i>		10
<i>Hatcher Hammers</i>		12
<i>Pincers, pairs</i>		12
<i>Formers</i>		10
<i>Beds</i>		10
<i>Coyns</i>		30
<i>Heads and Rammers, pairs</i>		10
<i>Crows of Iron</i>		10
<i>Aprons of Lead</i>		10
<i>Sheet Lead for Ditto, hundred weight</i>		12½
<i>Powder-horns</i>		16
<i>Priming-Irons</i>		16
<i>Bits hallow</i>		16
<i>Drifts of Steel</i>		16
<i>Tampeons ordinary</i>		60
<i>Baskets, Dozens</i>		2

Spare Stores.

<i>Ladle Staves</i>	15
<i>Wadhooks</i>	10
<i>Copper Spoons for Ladles</i>	6
<i>Copper Nails</i>	250
<i>Handspikes</i>	12
<i>Beds</i>	10
<i>Formers</i>	5
<i>Funnels of Tin Plate</i>	12
<i>Budge Barrels</i>	12
<i>Wooden Mallets</i>	12

Hand screws

*Names of Stores.*N^o.

Handscrews	3
Tilts of Hair	5
Gyn furnished	1
Rope of 3 inches for Draught, Coyle	1½
Heads and Rammers, pairs	10
Gages for Shot	4
White Calf Skins	8
Cords for Packing	30
Iron Drifts for Granadoes	6

Iron Work.

Ladle Hooks for Field Carriages, pairs	15
Tackle-Hooks, pairs	12
Forelocks, pairs	12
Linch-Pins, pairs	12
Spikes of forts	250
Sledges	5
Horse-Shoes	800
Horse-Shoe Nails	6000
Great melting Ladles	2
Small	4
Nails of forts	7000
Iron Wedges Steel'd	5
Washers, pairs	20
Clouts, pairs	45
Clouts Nails	7000
Hurters	30
Iron in Bars, Hundred weight	6
Steel, Hundred weight	2½

Ammunition for the Train.

Powder in Barrels	40
Match, Hundred weight	45

Round

Names of Stores.

No.

<i>Round Shot</i>	{	<i>Demy Culvering</i> _____	300
<i>for</i>		<i>Saker</i> _____	300

<i>Bags of Canvas to contain small Shot</i> _____	200
<i>Handgranadoes fixt</i> _____	400
<i>Ditto unfixt</i> _____	400
<i>Spare Fuzes</i> _____	850
<i>Paper for Cartridges, Rheams</i> _____	6
<i>Canvas for Cartridges, Ells</i> _____	150
<i>Leather Bags to carry Powder</i> _____	15

Carriages, viz.

<i>Waggons covered</i> _____	10
<i>Tunbrels</i> _____	10
<i>Shot-Carts</i> _____	5

Horse-harnes for the Guns, viz.

<i>Thill Harnes</i> _____	10
<i>Trace Harnes</i> _____	60
<i>Fore Horse-Halters</i> _____	10
<i>Bit Halters</i> _____	30
<i>Hemp Halters</i> _____	70
<i>Ridg Ropes and Wanties</i> _____	10
<i>Cart Whips</i> _____	20

More for the Waggons.

<i>Thill Harnes</i> _____	10
<i>Trace Harnes</i> _____	60
<i>Fore Horse-Halters</i> _____	10
<i>Bit Halters</i> _____	30
<i>Hemp Halters</i> _____	70
	<i>Ridg</i>

*Names of Stores.*N^o.

Ridg Ropes, &c	10
Whips	10

More for the Tumbrels.

Thill Harness	10
Trace Harness	60
Hemp Halters	60
Ridg Ropes	10
Whips	10
Whit Leather Hides	5
Cart Saddle Trees	10

For the Shot Carts.

Thill Harness	5
Trace Harness	30
Hemp Halters	30
Ridg Ropes	5
Whips	5

Spare Timber.

Planck of Elm 2 or 3 Inches scantling, Feet	100
Bulks or Firr Timber	30
Spars great and small	100
Oak Planck of 2 and 3 Inches, Feet	50

Artificers Tools.

Smith's Tools, Set	1
Carpenters Tools, Set	1
Wheel-wrights Tools, Set	1
Gunsmith's Tools, Set	1
Colermakers Tools, Set	1

Mate

Materials and Stores incident to the Train, viz.

	N ^o .	
Shovels	350	
Spades	250	
Steel Spades	50	
Pickaxes	200	
Wheelbarrows	50	
Handbarrows	30	
Hand-Hatchets	80	
Bills	20	
Felling Axes	15	
Bags to carry Earth	200	
Tann'd-Hides	10	
Leather Buckets	15	
Sheep Skins, Dozens	3	
Lanterns Ordinary	6	
Dark	3	
Grease and Tar mixt, Hundred weight	3	
Tallow, Hundred weight	$\frac{1}{4}$	
Spare-hoops for Barrels,	$1\frac{1}{2}$	
Smeering Tubs	30	
Tents to cover Ammunition	3	
Oyl, Gallons	2	
Starch, Pounds	6	
Twine, Pounds	4	
Needles, Dozens	4	
Thread, Pounds	4	
Small Beam and Scales with 8 Pound Pile, pairs	1	
Tar'd Rope	$\left\{ \begin{array}{l} 2\frac{1}{2} \text{ Inches, Coyle} \\ 2 \text{ Inches, Coyle} \\ 2\frac{1}{2} \text{ Inches Coyle} \end{array} \right.$	1 1 1
Tar, Barrels		10

Writing

	N ^o .
Writing Paper, Rheams	$\frac{1}{2}$
Ink, Quart	1
Quills	100
Hirdles	100
Packneedles	15
Sacks to carry Match	10
Tilts of Hair to cover Ammunition	4
<i>Defences.</i>	
Turn Pikes or <i>Sheval de Freez</i>	50

You are to take Notice that Powder and Ammunition is always carried by the Kings Carriages, and for all other Necessaries as Timber, &c. are carried by Carriages belonging to the Country, who are paid according to Act of Parliament. But if you are to March into forreign Parts you must supply your self with Horses, which are to be proportioned to every Carriage, as I have directed before.

FINIS.

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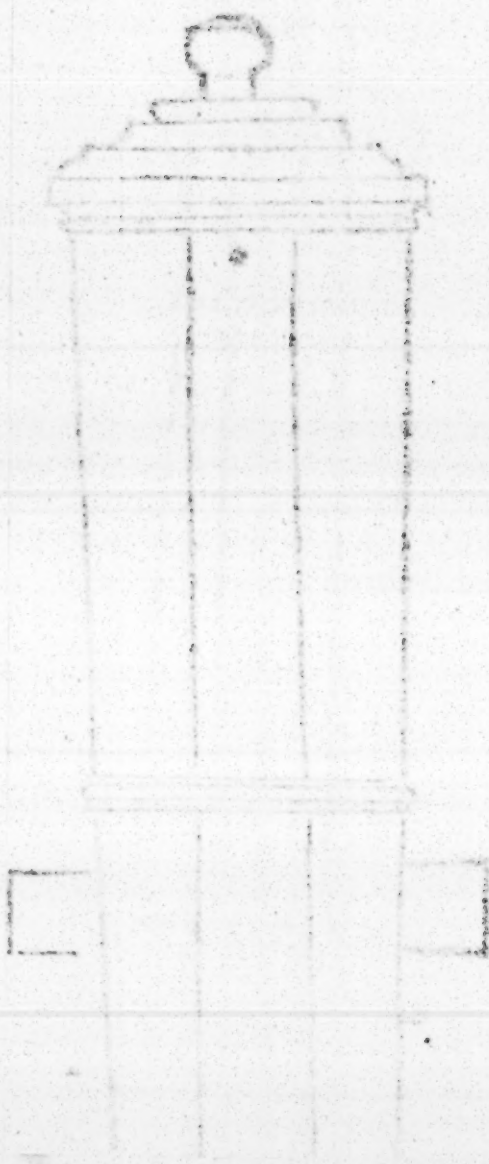


Figure 1.

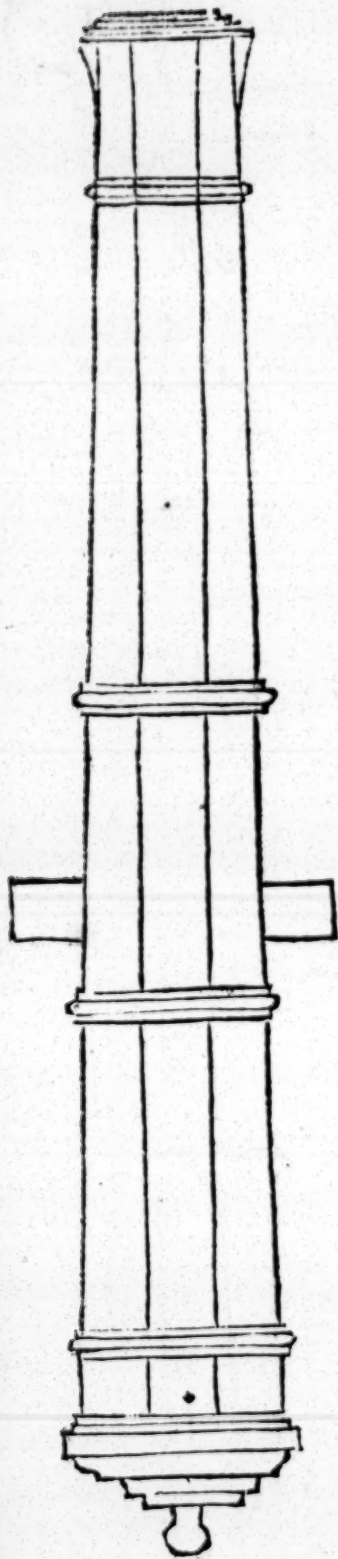
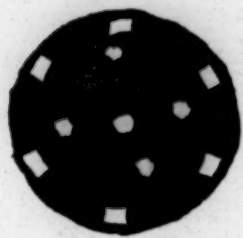
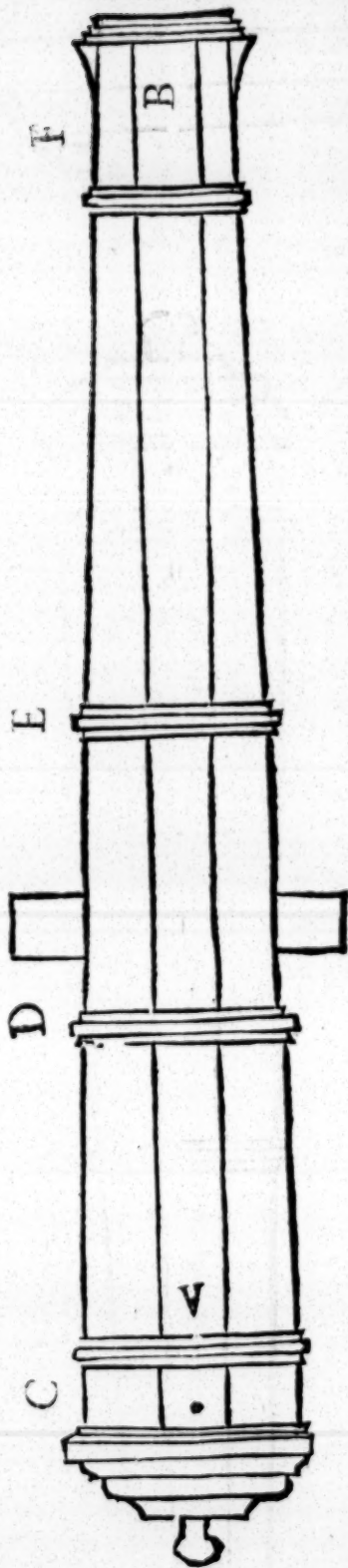


Figure 4.



Fire-Shot.

Figure 5.

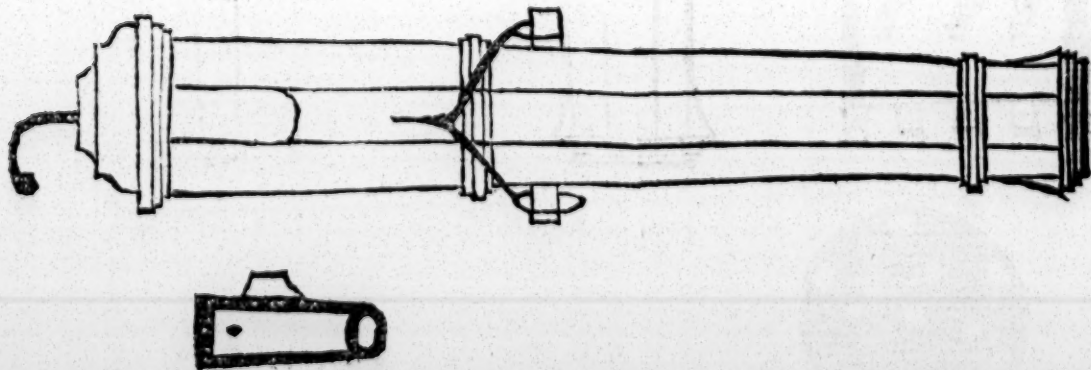
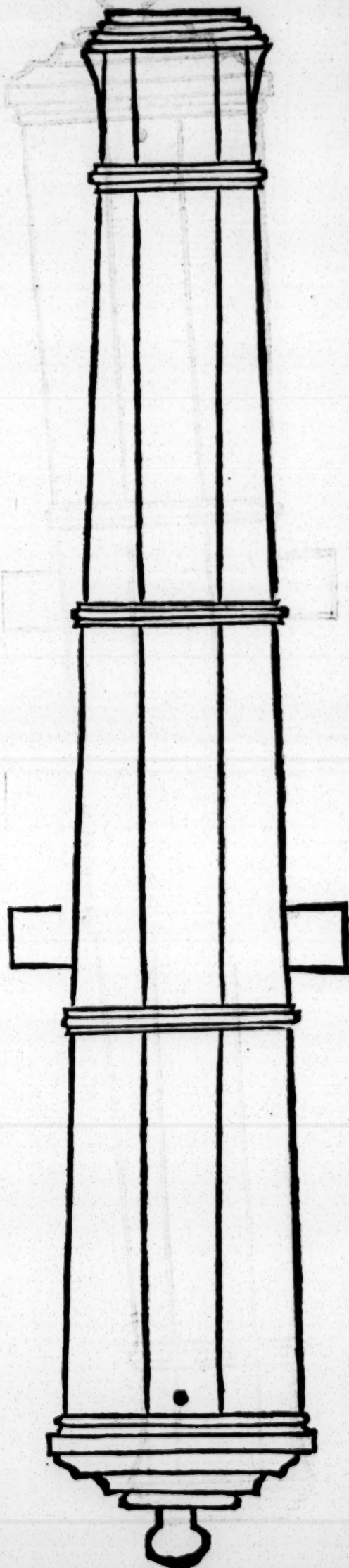


Figure 6.



